US Army Corps
of Engineers
Buffalo District

Blanchard River Watershed Study

Interim Feasibility Report

Appendix E:

Environmental Appendix

April 2015

Environmental Appendix

Contents

1.0 404 Documentation

CLEAN WATER ACT

SECTION 404(b)(1) EVALUATION

BLANCHARD RIVER FLOOD RISK MANAGEMENT PROJECT

HANCOCK COUNTY, OHIO

1. PROJECT DESCRIPTION

1.1 Background – This evaluation is part of the Blanchard River Flood Risk Management Study in the vicinity of the city of Findlay, Ohio. The authority for this study is Section 441 of the Water Resources Development Act of 1999 (WRDA 99) – Western Lake Erie Basin, Ohio, Indiana and Michigan. The geographic scope of analysis of the proposed action and project alternatives includes the Blanchard River Watershed within the vicinity of the city of Findlay (Figure 1.1). Historically, the most significant flooding impacts in the Blanchard River Watershed have occurred in the City of Findlay. The City of Findlay is located in Hancock County, approximately 50 miles south of Toledo and roughly 50 river miles upstream of the confluence of the Blanchard and Auglaize Rivers.

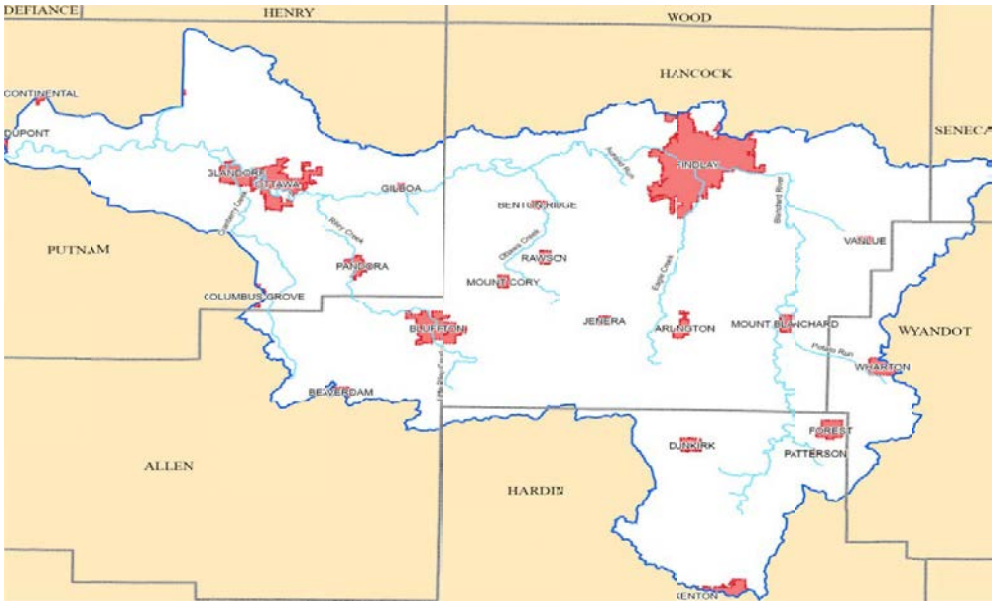

Figure 1.1. The Blanchard River Watershed (Blanchard Watershed Assessment, 2009)

The Blanchard River has reached or exceeded major flood stage 23 times over the past 100 years. Of these, nine have occurred since 1990. Five of the events recorded between 1990 and

2011 have been among the top ten stages ever recorded, with three peaking at over major flood stage, and one (the August 2007 event) reached a peak stage of only 0.04 feet less than the peak stage ever recorded back in 1913. Damages during the August 2007 event were estimated by the Northwest Ohio Flood Mitigation Partnership to be roughly $60 million in the Findlay area.

A number of structural measures were analyzed as part of the present study to address flooding within the vicinity of Findlay, Ohio. Section 4.6.3 of the Integrated Detailed Project Report/Environmental Impact Statement provides a discussion of the screening criteria employed to narrow the project down to a final array of alternative plans, which comprises the tentatively selected plan.

Measures that are addressed within the present Section 404 (b)(1) analysis include two distinct alternative measures that would divert flood waters from Eagle Creek south of Findlay to the Blanchard River downstream of Findlay the Blanchard River. The first measure is the Aurand Run Alignment and the Alternative 2 Diversion Alignment (Figure 1.2). The Blanchard to Lye cutoff levee, which would limit flow from the Blanchard River to Lye Creek during high water events, is also proposed as part of this project (Figure 1.3).

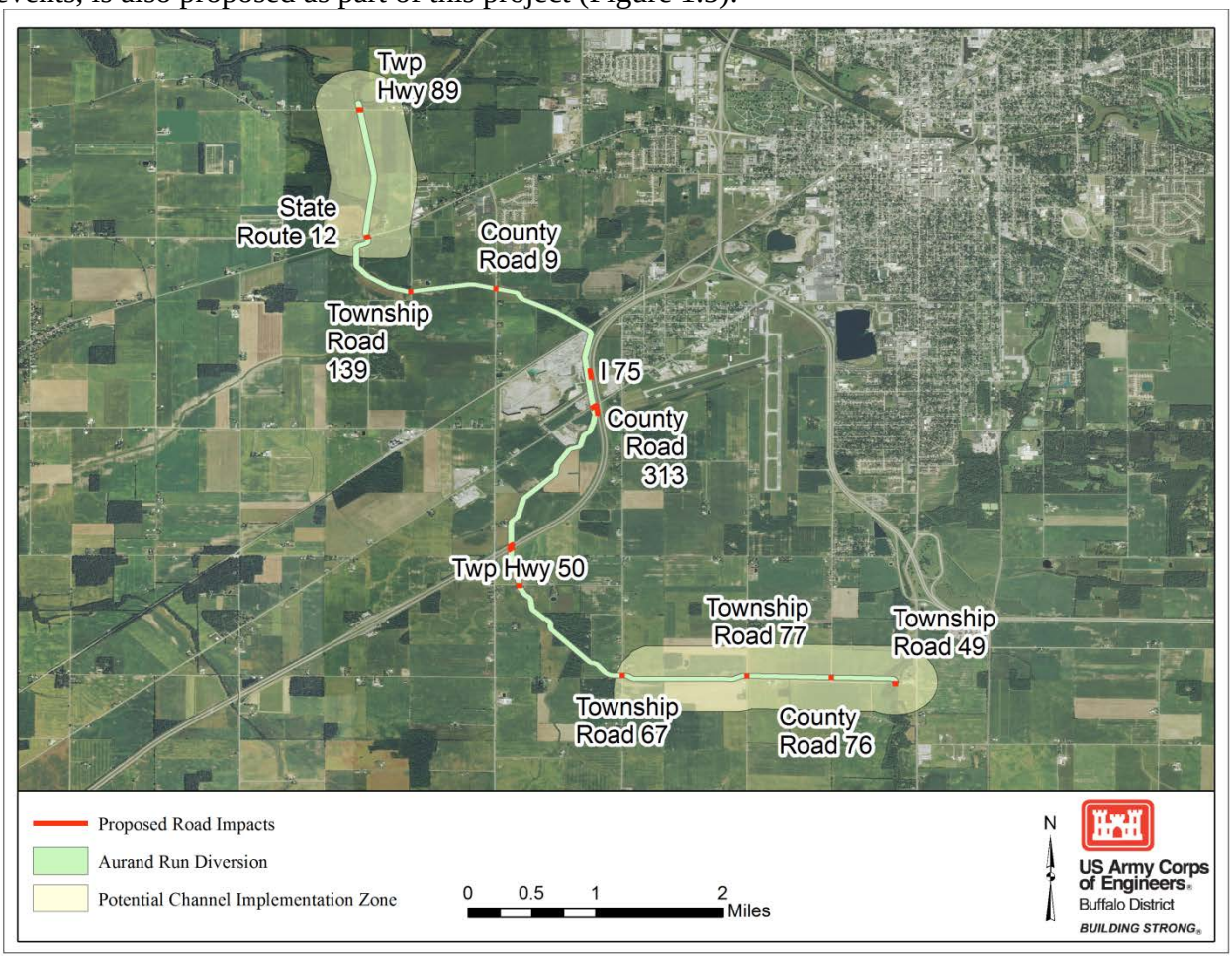

Figure 1.2. Proposed Aurand Run Alignment from Eagle Creek to the Blanchard River. The Alignment is approximate and may change slightly based on optimization.

1.2 Flood Risk Management Measure Locations

1.2.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – The proposed Aurand Run Alignment would begin at Eagle Creek downstream of Township Road 48 and flow in a westerly direction across Township Roads 77, 76 and 67 (Figure 1.2). Downstream of Township Road 67 the alignment would converge with and generally follow the existing footprint of Aurand Run until it reaches County Road 12. After crossing County Road 12 the alignment would divert away from Aurand Run to the north and discharge into the Blanchard River after crossing Township Road 89.

1.2.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – The proposed Alternative 2 Diversion Channel Alignment would begin at Eagle Creek and would flow in a westerly direction across County Road 45 and Township Roads 77, 76 and 67 (Figure 1.3). The alignment would then change course approximately 500 feet to the west of Township Road 67 where it would then take a northerly route across Township Road 50 and Interstate 75. The channel would then turn back toward the west and continue in a westerly direction across County Roads 9 and 313, the Norfolk Southern Railroad and Township Road 10. The alignment would then bend northward approximately 1,400 feet to the west of Township Road 10 where it would run parallel to and cross Township Road 130 approximately 2,800 feet to the south of Township Road 89. After crossing Township Road 130, the channel would continue along a northerly path and discharge into the Blanchard River approximately 1,600 feet to the west of Township Road 130 after crossing Township Road 89.

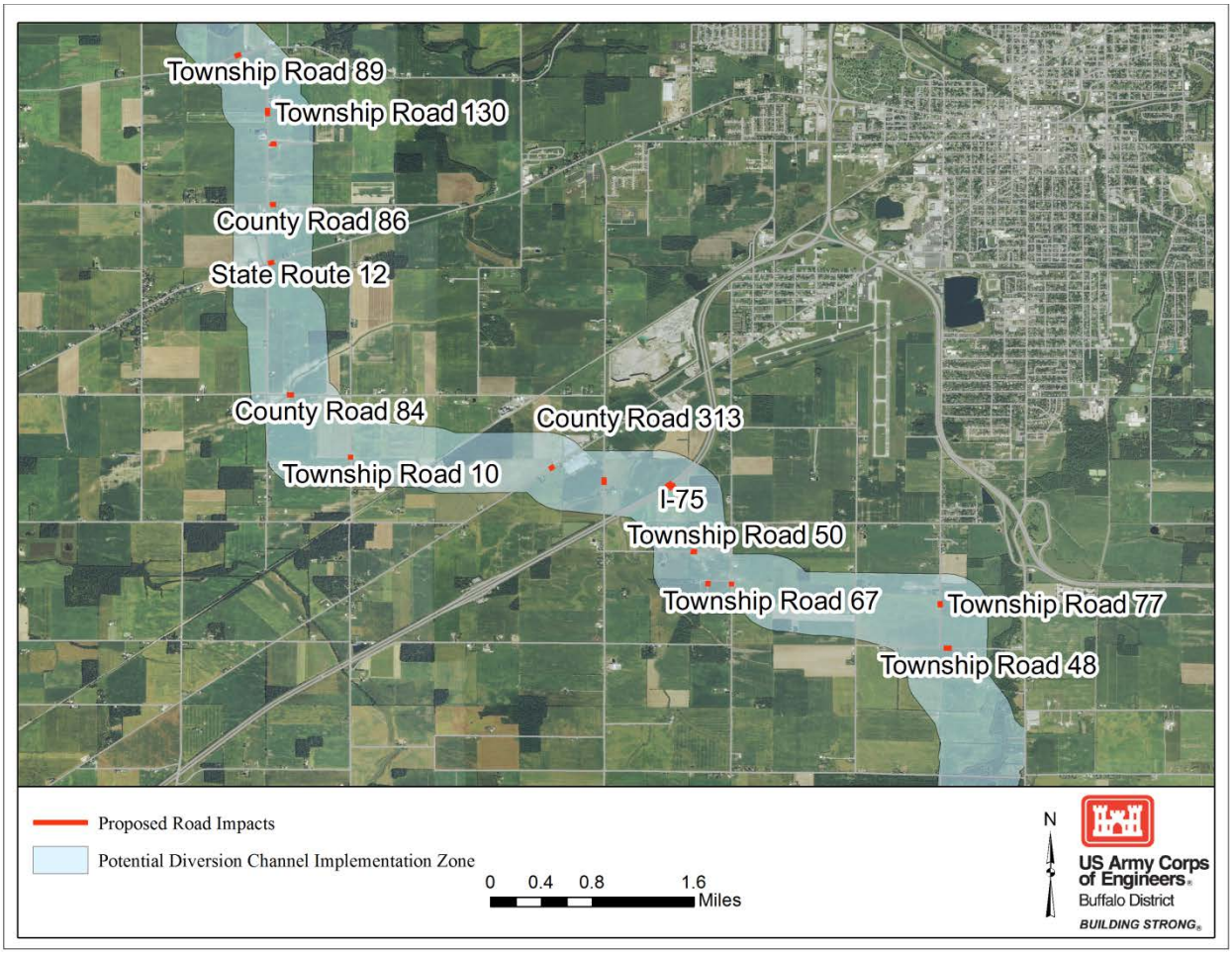

Figure 1.3. Proposed Aurand Alternative 2 Alignment from Eagle Creek to the Blanchard River. The Alignment is approximate and may change slightly based on optimization.

1.2.3 *Blanchard to Lye Cutoff* – The Blanchard to Lye Cutoff Levee is proposed to follow the left bank of the Blanchard River from the Findlay Reservoir across County Road 205 to Township Road 173 and from Township Road 173 southward to State Road 15 (Figure 1.4).

Figure 1.4. The proposed Blanchard to Lye Cutoff Levee. The Alignment is approximate and may change slightly based on optimization.

1.3 General Description – The integrated Feasibility Report and Environmental Impact Statement (EIS) present a full discussion of the need for action, opportunities, objectives, and alternative solutions to address those identified problems. Field work to date indicates that wetland impacts under both diversion options might be less than indicated based on National Wetland Inventory (NWI)/Ohio Wetland Inventory (OWI) and hydric soils data. Additional wetland impacts may be incurred through the placement of fill material into the quarry. The quarry is an isolated state water resource that appears to be groundwater fed with no above surface inflow or outflow recognized during desktop studies. This site is therefore not classified as waters of the United States. While the amount of armoring associated with the confluence between either the Aurand Run or the Alternative 2 Alignment and the Blanchard River is unknown, it is expected that it would be roughly the same under each option.

1.3.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – The Aurand Run Channel would be approximately 7.7 miles long (slope = .07% to .14%), with an approximate 40 foot bottom width, a minimum depth of 15 feet , and have side slopes of 3H:1V. This alignment

would impact seven existing bridges, including Interstate 75 and the Norfolk Southern Railroad. It would also require the permanent filling of 106.29 acres of wetland, with another 21.54 acres of potential wetland loss if adjacent wetlands are drained due to construction activities (Table 1.1). It is important to note that these estimates are only based on NWI/OWI and hydric soils data and would have to be verified through wetland delineations once site access is gained. Approximately 35,157 linear feet of stream would be impacted as a result of the implementation of this alternative, which would include the elimination of riffle and pool complexes currently present throughout the lower reaches of Aurand Run as well as impacts to tributaries that feed into Aurand Run. Four new bridges would be constructed to accommodate where the alignment crosses Township Roads 89, 77, 76 and 67. In addition, as many as eight new bridges would be required to cross Aurand Run as the new channel would required the demolition and reconstruction of bridges at State Route 12, County Roads 9 and 313, the Norfolk and Southern Railroad, Interstate 75, and Township Roads 139 and 50. Permanent easements totaling approximately 223 acres would be needed for the proposed channel inlet and channel structure at Eagle Creek, which includes an additional 25 feet of easement on both sides for the channel and 50 feet of additional easement on both sides for the diversion structure. Access roads are assumed to be needed on both sides of the channel for equipment during construction and future access to the site.

1.3.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – The channel for the Alternative 2 Diversion Alignment would be approximately 9.3 miles long (slope = .035% to .215%), with a 35 to 47 foot bottom width, a minimum depth of 10 feet (varies), and have side slopes of 4H:1V. Based on the NWI/OWI and hydric soils data available, this alternative would include impacts to 6.28 acres of wetlands, with another 4.50 acres of potential wetland loss if adjacent wetlands are drained due to construction activities (Table 1.1), although this data would have to be verified through wetland delineations once site access is gained. It is also expected that approximately 5,507 linear feet of stream would be impacted through the implementation of this measure. To accommodate the proposed diversion channel alignment, eight bridges and the construction of 29 new bridges will likely be required. Permanent easements totaling approximately 272 acres would be needed for the proposed inlet channel and diversion structure, which would include an additional 25 feet of easement on both sides for the channel and 50 feet of additional easement on both sides for the diversion structure. Access roads are assumed to be needed on both sides of the channel for equipment during construction and future access to the site.

Table 1.1. Expected direct and indirect wetland impacts and stream impacts under the various structural measures.			
Impacts	**Aurand Run Alternative**	**Alternative 2 Alignment**	**Blanchard to Lye Cutoff**
Wetland – Direct (acres)	106.29	6.28	0.81
Wetland – Potential (acres)	21.54	4.50	0.00
Stream (linear feet)	35,157	5,507	N/A

1.3.3 *Blanchard to Lye Cutoff* – This measure would be approximately 9,800 feet in length, with a maximum height of nine feet and 3:1 side slopes. Approximately 77,000 cubic yards of embankment fill will be required to construct the berm. Based on the NWI/OWI and hydric soils data available, this alternative would include impacts to approximately 0.81 acres of wetlands, with no indirect impacts to wetlands expected based on current designs (Table 1.1), although this data would have to be verified through wetland delineations. No stream impacts are expected, and while two freshwater ponds occur in the vicinity of the proposed measure, wetland impacts are expected to be below one acre through the implementation of this potential measure. Permanent easements totaling approximately 20 acres would be needed for the proposed levee, which would include an additional 25 feet of easement on both sides of the cutoff levee. It is important to note that the precise location of the proposed levee has not yet been determined and changes can be made in the layout to minimize impacts to nearby wetlands and forested areas.

1.4 Authority and Purpose – The authority for this study is provided by Section 441 of WRDA 99. The goal of the project is to provide flood risk management for the communities of Findlay and Ottawa, Ohio. The following objectives will be achieved throughout the period of analysis:

a. Reduce flood risk and flood damages in the City of Findlay and Hancock County, Ohio.
b. Overall annual damages and the frequency of road closures should be significantly reduced.
c. Exploit riparian wetland restoration opportunities along the Blanchard River and other applicable areas in conjunction with other flood risk management measures.
d. Provide recreational opportunities and enhanced connection to the river in conjunction with other project measures.

1.5 General Description of Fill Materials

1.5.1 *General Characteristics of Material* – The primary material that would be required to construct either of the potential diversion measures is concrete and associated fill materials. Fill material will also be obtained as a result of excavation of the diversion channel (i.e., rock, soil). The proposed Blanchard to Lye Cutoff will consist of an earthen levee composed of clay and topsoil.

1.5.2 *Quantity of Material*

1.5.2.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – The Aurand Run Alignment would be constructed by using large earth moving and hauling equipment to excavate approximately 1,255,000 cubic yards of soil, 1,030,000 cubic yards of rock, and to place 70,000 cubic yards of fill for berms alongside the new channel. Excavated material, except what would be required to construct the channel berms, would be disposed of at a quarry located in Findlay near the airport. Approximately 33,000 cubic yards of material excavated from the upstream end of the diversion channel would be used for the construction of the proposed diversion structure and berm located on the south side of Township Road 48. Approximately 2,700 cubic yards of concrete and 400 cubic yards of Roller Compacted Concrete will be used to construct the spillway/stilling basin and retaining walls (Figure 1.3). Suitable excavated materials from the diversion channel construction, along with the potential for concrete in some locations, will constitute the type of fill material causing the Section 404 stream and wetland impacts.

1.5.2.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – It is anticipated that the 9.3 mile long channel associated with the Alternative 2 Diversion Alignment would be constructed with roughly 2,047,000 cubic yards of soil excavation. Approximately 136,000 cubic yards of fill from the excavated channel will be used for berm construction alongside portions of the new channel using large earth moving and hauling equipment. Another roughly 10,000 cubic yards of material excavated for the proposed diversion channel, culverts and channel inlet will be used to construct the proposed diversion inlet structure. Two concrete gatewells, a concrete headwall drop structure and 50 linear feet of concrete culvert (8’ by 6’) will also be incorporated into the inlet structure (Figure 1.4). All remaining excess excavated material will be disposed of at a quarry located in Findlay near the airport. Topsoil stripped from the channel footprint will be reused for portions of the channel.

1.5.2.3 *Blanchard to Lye Cutoff* – It is anticipated that 77,000 cubic yards of embankment fill will be needed to construct the earthen levee. All remaining excess excavated material will be disposed of at a quarry located in Findlay near the airport (Figure 1.2). Topsoil stripped from the channel footprint will be reused for portions of the channel.

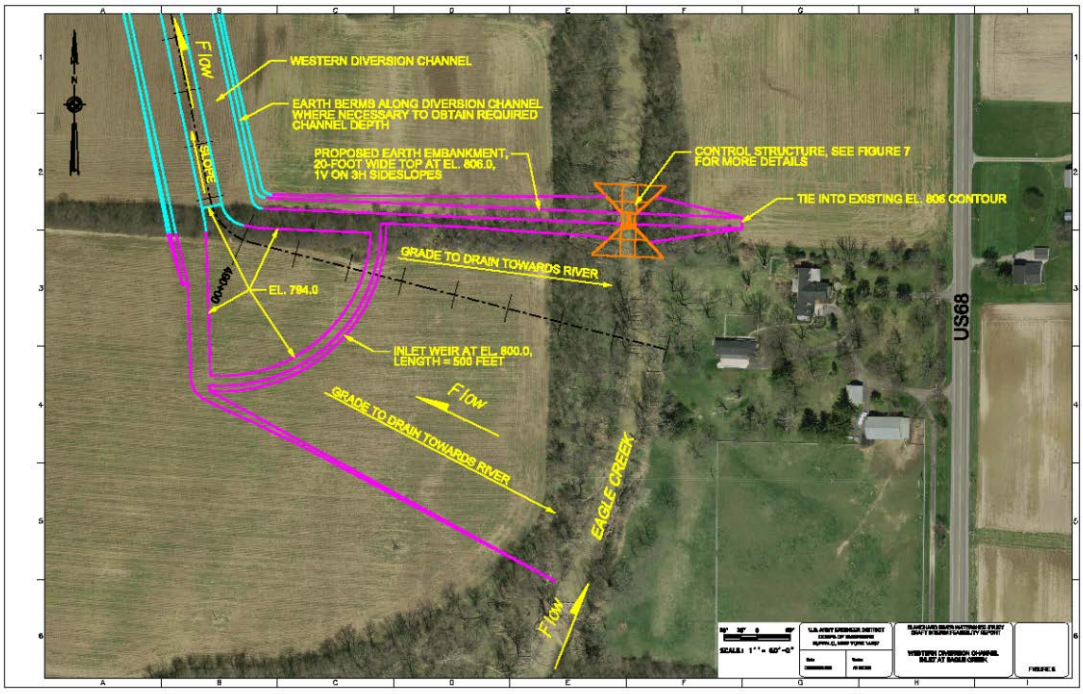

Figure 1.4. Location of Diversion Channel Inlet and Diversion Structure at Eagle Creek under both the Aurand Run and Alternative 2 Alignments (see Cost Engineering Appendix for more information).

1.5.3 *Source of Material* – Construction materials for the diversion channel would be obtained from existing commercial sources (e.g., concrete). Fill material will also be obtained as a result of excavation of the diversion channel (i.e., rock, soil). Materials for the construction of the cutoff levee will include clay and six inches of topsoil covered with native plant seeding on the exposed surfaces.

1.6 Description of the Proposed Discharge Sites

1.6.1 *Location*

1.6.1.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – The riparian wetlands and streams associated with this measure are directly adjacent or abutting Aurand Run. The majority of these waterways occur within the forested riparian corridor of Aurand Run and are a mixture of forested, scrub-shrub, and emergent wetlands.

1.6.1.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – As with the Aurand Run measure, the riparian wetlands and streams associated with the Alternative 2 Alignment are directly adjacent or abutting the proposed measure.

1.6.1.3 *Blanchard to Lye Cutoff* – This measure will be adjacent and run parallel to the Blanchard River upstream of Findlay. The majority of the river within this section is forested,

with some shrub areas present. There are also two small ponds within the immediate vicinity of the proposed levee.

1.6.2 *Size* –

1.6.2.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Based on the available desktop information, the estimated acreage of wetland impact for the Aurand Run Alignment would be 106.29 to 127.83 acres. In addition, approximately 35,157 linear feet of stream (e.g., mostly occurring in Aurand Run) would be impacted. The wetland impacts under this alignment would occur from a combination of direct fill activities and the drainage that would occur due to the close proximity of the deeper diversion channel. It is expected that most impacts would result from diversion channel excavation rather than the discharge of fill.

1.6.2.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – The estimated acreage of wetland impact for the Alternative 2 Diversion Channel would be 6.28 to 10.78 acres. In addition, approximately 5,507 linear feet of stream (i.e., Aurand Run, Blanchard River) would be impacted. As discussed under the Aurand Run Alignment, the wetland impacts under this measure would be a combination of direct fill activities and drainage that would occur due to the close proximity of the deeper diversion channel. It is expected that most impacts would result from diversion channel excavation rather than the discharge of fill.

1.6.2.3 *Blanchard to Lye Cutoff* – It is estimated that less than one acre of wetland impact will occur through the implementation of the Blanchard to Lye Cutoff Levee. It is expected that wetland impacts under this measure would occur as a result of the placement of direct fill, similar to what would occur under the western diversion measures.

1.6.3 *Type of Site* –

1.6.3.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – This alignment would partly extend through active agricultural areas and the edge of some woodlots. The Aurand Run Alignment would be located mostly along the existing Aurand Run channel and would replace much of this stream with bedrock-lined channel.

1.6.3.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – This alignment would also run through active agricultural areas and woodlots, with a greater area of woodlots impacted under this diversion alternative.

1.6.3.3 *Blanchard to Lye Cutoff* – The cutoff levee would be built upon agricultural land and the edge of woodlots, including forested wetlands.

1.6.4 *Type of Habitat* –

1.6.4.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – This alignment would impact the Aurand Run riparian area as well as various other stream crossings and wetland areas. Aurand Run was designated by the Ohio Environmental Protection Agency (OEPA) as being suitable for designation as a Warmwater Habitat, which are habitat types noted as supporting significant assemblages of aquatic life. According to Ohio Rapid Assessment

Method (ORAM) documentation on wetland habitat quality, the wetlands that would be impacted as a result of the Aurand Run Alignment are aquatic bed, emergent, shrub, forested, mudflats and open water ranging from category 1 to category 3.

1.6.4.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – This alignment would also impact Aurand Run and other streams through crossing structures and various wetland areas. ORAM and wetland delineation information is not yet available for the Alternative 2 Alignment, but likely involves a combination of forested wetlands and intermittent streams surrounded by agricultural fields.

1.6.4.3 *Blanchard to Lye Cutoff* – The cutoff levee may impact wetlands, although the present design minimizes these impacts. While ORAM and wetland delineation information is not yet available for this measure, habitat in the vicinity of the cutoff levee would likely include forested wetlands surrounded by agricultural fields.

1.6.5 *Timing and Duration of Discharge* – At this time, construction of this project would most likely take place between June 16 and February 28 to account for potential environmental windows and the need for lower flow conditions in area streams. This environmental window is based on recommendations provided by the U.S. Fish & Wildlife Service (USFWS).

1.7 Description of Discharge Method –

1.7.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Construction of a diversion channel would be conducted along Aurand Run or within agricultural fields with some stream crossings. Construction equipment such as pile drivers, dump trucks, backhoes, excavators, and front-end loaders would perform the work. The order and exact method of discharge associated with construction will depend on location, but for the most part the areas of the new channel would have the topsoil scraped off and stockpiled, followed by excavation of the new channel down to bedrock. The new channel would be bedrock at many locations, and berms would be constructed at certain areas adjacent to the channel. With the Aurand Run Alignment the entire stream length would be impacted through excavation and then through associated fill discharges into some wetland and stream areas. Approximately 35,157 linear feet of Aurand Run would be impacted by excavating the bed and reshaping the banks to increase the cross section of the channel to handle the addition floodwaters that would be directed down the channel from Eagle Creek.

1.7.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* –The methods and equipment utilized for the construction of this measure would be similar to those employed for the Aurand Run Alignment (with the exception of impacts to Aurand Run being limited to a crossover location). There will much less stream impacts (approximately 5,507 linear feet) associated with the Alternative 2 Alignment in comparison to the Aurand Run Alignment as well as a smaller amount of wetland impacts (between approximately 6.28 and 10.78 acres).

1.7.3 *Blanchard to Lye Cutoff* – The cutoff levee would be created through the use of construction vehicles including dump trucks, backhoes, excavators, and front-end loaders. Required fill would be obtained from onsite borrow locations and excavated areas will be

regraded to provide positive drainage and unsuitable material disposed of onsite and graded. The 9,800 linear foot stretch of the proposed levee would include fill discharges into some wetland and pond areas, although is not expected to impact the Blanchard River.

2. FACTUAL DETERMINATIONS

The construction materials (soil, rock, stone) to be used are chemically inert and physically immobile under existing conditions. Placement of concrete for the diversion structure and associated features will be protected from exposure to surface waters until they are set. These characteristics eliminate the possibility of chemical-biological interaction and any testing specified under 40 CFR Part 230.61 is not applicable in this instance.

2.1 Physical Substrate Determinations

2.1.1 *Substrate Elevation and Slope –*

2.1.1.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – The proposed Aurand Run Diversion Channel is approximately 7.7 miles long (slope .07 to .14%), with a 40 foot bottom width, 15 feet deep (minimum), and with 3:1 side slopes.

2.1.1.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – The proposed Diversion Channel for Alternative 2 is approximately 9.3 miles long (slope .035 to .215%), 35 to 47 foot bottom width, minimum depth of 10 feet (varies) with 4:1 side slopes.

2.1.1.3 *Blanchard to Lye Cutoff* – The Blanchard to Lye cutoff levee is proposed to span 9,800 feet with a maximum height of nine feet and 3:1 side slopes.

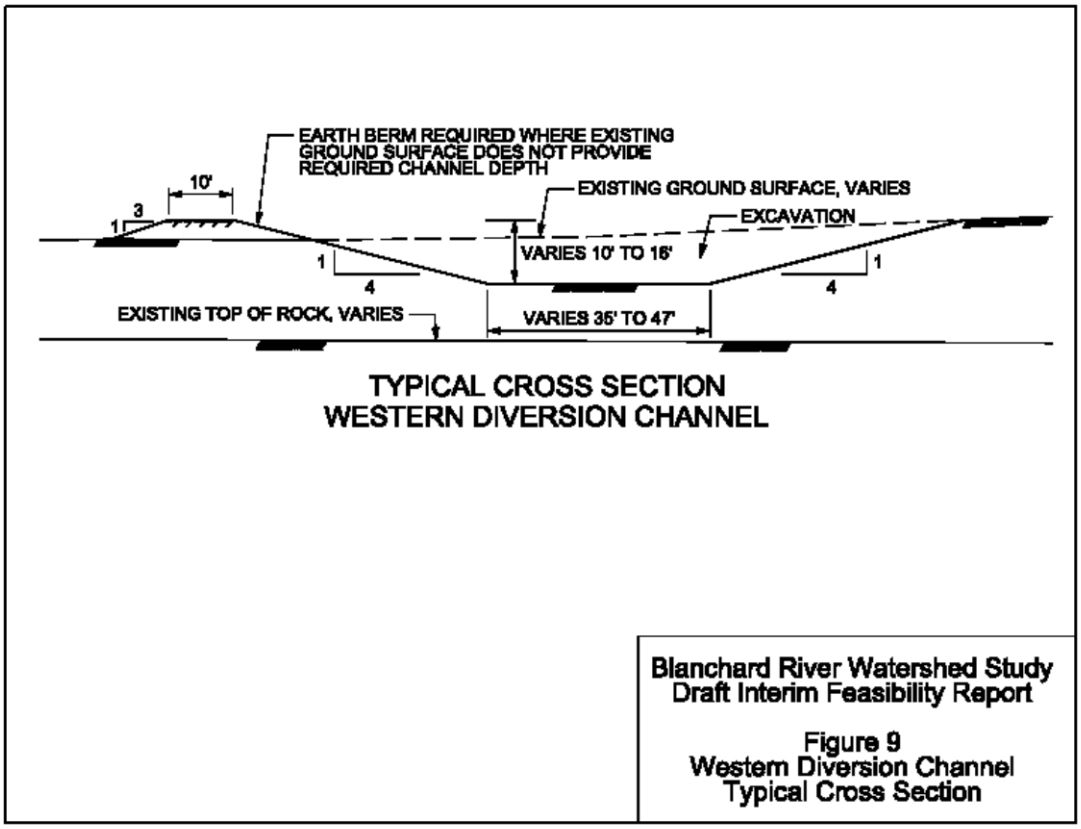

Figure 5. Typical Diversion Channel Cross Sections for the Alternative 2 Alignment.

2.1.2 *Sediment Type* –

2.1.2.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Construction of the proposed project under this diversion measure would result in the replacement of a portion of the Aurand Run and Eagle Creek stream channels with concrete or bedrock.. The material currently at the location of the proposed alignment locations and that would be removed during construction consists of a mixture of soil, clay, and rock.

2.1.2.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – As with the Aurand Run Alignment, this alternative would include the removal of soils, clay and rock. Impacts to streams under Alternative 2 Alignment are expected to be localized to stream crossings, (such as the crossing between the diversion alignment and Aurand Run).

2.1.2.3 *Blanchard to Lye Cutoff* – The implementation of this measure would also include the removal of soils, clay and rock.

2.1.3 *Fill Material Movement* –

2.1.3.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Every precaution to avoid the movement of substrate through erosion, slumpage, or other movements of the fill

outside of the discharge site would be taken, however, there is a possibility that detrimental impacts could occur to the bottom substrate due to modification of flows and turbidity from flood waters. The diversion channel bed and banks under both alternatives will be armored in the areas where high water velocities are expected. The placement of fill below the ordinary high water mark of Aurand Run, Eagle Creek and the Blanchard River will include substrate appropriately sized to avoid the movement of fill downstream and to provide for erosion protection. Topsoil will be placed above the ordinary high water mark as well and will be planted with native vegetation in order to minimize erosion. It is likely that a contractor of the federal government would be completing this work and therefore there would be a requirement for them to produce a Pollution Prevention Plan and Stormwater Management Plan.

2.1.3.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – The same best management practices (BMPs) discussed under the Aurand Run Alignment would be incorporated into this diversion option.

2.1.3.3 *Blanchard to Lye Cutoff* – Best management practices associated with this measure would include the placement of six inches of topsoil and native herbaceous plant seeding on the top and both sides of the proposed levee. A Pollution Prevention Plan and Stormwater Management Plan will also include the cutoff levee effort.

2.1.4 *Physical Effects on Benthos* –

2.1.4.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Construction activities would result in the permanent impact of the entire Aurand Run stream channel under the Aurand Run Alignment due to bed excavation and side slope recontouring. More minor and localized impacts to Aurand Run would occur through implementation of the Alternative 2 Alignment. Under either alternative, however, there will also be adverse impacts to benthos in Eagle Creek (e.g., diversion structure) and the Blanchard River where the diversion channel enters downstream of Findlay. There is a possibility that permanent detrimental effects to benthos could occur as a result of bottom substrate alternation due to the modification of flows and turbidity from flood waters. Permanent detrimental effects would likely be localized to the area where the diversion channel would join with the Blanchard River. Permanent impacts would occur through the destruction or covering of immobile and sedentary benthic species and their habitat in bottom sediments along the extent of the Aurand Run (Plan F2a) and in Eagle Creek at the location of the diversion structure, stilling basin and retaining walls. Impacts to the benthos under the Aurand Run Alignment are expected to be significant within approximately 35,157 linear feet of the diversion channel that would occur within the present Aurand Run channel. This would be due to the excavation and lowering of the creek bed, which would remove the existing substrate in many instances and replacing it with bedrock. In addition, significantly greater flows would be diverted into the former Aurand Run channel as a result of high water diversions from within Eagle Creek under Plan F2a. A new benthic community may establish in portions of the new diversion channel under the Aurand Run Alignment, which may be periodically impacted as a result of increased sedimentation and turbidity during high water events.

2.1.4.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – Under Alignment 2, it is not expected that a benthic community will establish along the newly created channel as it would likely be seasonal in nature. Any new community that might become established along this alignment would also be impacted periodically by increased sedimentation and turbidity during high water events. There is an area proposed under this alternative where the channel would intersect the present Aurand Run and other smaller tributaries. While these crossing impacts would be considered permanent due to construction activities, the crossing would span no more than 80 to 100 feet of Aurand Run and even less for the other tributaries. Impacts will also be incurred where the diversion begins at Eagle Creek and where it rejoins the Blanchard River would also cover several hundred feet. The impacts to benthos associated with this measure are far less than those proposed under the Aurand Run Alignment and are not expect to be significant.

2.1.4.3 *Blanchard to Lye Cutoff* – Approximately one third of an acre of freshwater ponds within the potential impact area of the proposed cutoff levee. It is expected that any benthic community within these two ponds will incur permanent impacts, however, these impacts are not expected to be significant, as the ponds are relatively small.

2.1.5 *Other Effects* – Not applicable under any of the proposed measures.

2.1.6 *Actions Taken to Minimize Impacts*

2.1.6.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – There are no actions that may be taken to reduce adverse impacts to benthos resulting from the discharge of fill material associated with the Aurand Run Alignment as the entire stream channel would be removed.

2.1.6.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – Under the Alternative 2 Alignment, impacts to benthos may be reduced during alignment optimization to ensure that the least ecologically sensitive sections of streams are crossed (e.g., narrowest, sections without quality buffer area). Some minimization may be available through the design of any culverts and/or bridge alignments at stream crossings to minimize erosion/scour and possibly preserve existing streambed. Keeping vegetation removal along the banks to a minimum would also help preserve benthos integrity and encourage re-establishment of any benthos that is disturbed during construction.

2.1.6.3 *Blanchard to Lye Cutoff* – Impacts to benthos under this alignment can minimized through the maintenance of vegetation along the banks of the ponds. This effort would help preserve the integrity of the present benthos and encourage the re-establishment of any disturbed benthos.

2.2 Water Circulation and Salinity Determinations

2.2.1 *Water*:

a. Salinity – Not applicable to any of the proposed measures.

b. Water Chemistry – No significant effect to any of the proposed measures.

c. Clarity – Construction activities on a temporary basis and high water events on a periodic basis (i.e., flood events), would result in short-term increases in turbidity within and downstream of either diversion channel alternative. Construction activities are also expected to incur short term impacts to water clarity. See also Section 2.3 of this evaluation.

d. Color – Water color at the project site would be temporarily altered during construction activities as a result of increased turbidity with implementation of either diversion alignment and the cutoff levee.

e. Odor – No significant effect under any of the proposed measures.

f. Taste – No effect/Not applicable to any of the proposed measures.

g. Dissolved Gas Levels – Both alignment alternatives may result in an increased exposure of re-routed Eagle Creek flood waters to sunlight and therefore higher water column temperatures. For the Alternative 2 Alignment, this impact is expected to be negligible, as water would only be exposed for short durations during flood events. For the Aurand Run Alignment on the other hand, a greater impact is anticipated, as this measure will be a wet diversion; meaning that water that was originally flowing in Aurand Run would now be flowing through the diversion channel on a permanent basis. As a result and due to the amount of existing forested buffer that would be removed to enable construction, a greater drop in post-project dissolved oxygen (DO) levels would be expected compared to pre-project conditions.

The cutoff levee may also remove some of existing forested buffer along the Blanchard River during the construction phase, although this would be to a far lesser extent proposed under the Aurand Run Alignment. This would also lead to a greater drop in post-project DO levels compared to pre-project conditions.

h. Nutrients – Nutrient runoff as a result of agricultural activities is expected to continue compared to existing conditions with implementation of either diversion channel alignment and the cutoff levee. It is likely that slightly more nutrient runoff would occur under Alignment 2 compared to the Aurand Run Alignment, as it would traverse through a greater amount of agricultural properties and intercept field drainage systems.

i. Eutrophication – A slightly higher probability and degree of eutrophication is expected under the Aurand Run Alignment as compared to existing conditions in Aurand Run. This is mainly due to the same expected nutrient loading to Aurand Run after project construction (flowing in new channel) in combination with anticipated higher water temperatures and lower DO levels (see ‘g’ above). The Alternative 2 Alignment is not expected to contain flow for a sufficient period of time to allow eutrophication to occur.

While the waters of the Blanchard River in the vicinity of the cutoff levee are not expected to be subjected to increased runoff, the slight increases in water temperature due to the loss of some of the riparian corridor during construction would see water temperatures rise slightly in this section of the Blanchard River.

2.2.2 *Current Patterns and Circulation*:

a. Current Pattern and Flow – The flow within the Blanchard River would be altered at the point where the diversion channel (either alignment) would discharge diverted Eagle Creek floodwaters into the Blanchard River downstream of Findlay. This increased flow to the Blanchard would then be mitigated in part through the downstream construction of offline detention areas between Findlay and Ottawa, Ohio. The present flow of water that goes down Eagle Creek to the Blanchard River would be diverted through either the Aurand Run Alignment or the Alternative 2 Alignment. The Aurand Run Alignment would include diverted Eagle Creek flows during high water events (and Aurand Run flows during base flow conditions) through 2.7 stream miles of newly constructed channel and 44,755 linear feet of bedrock diversion channel in the place of what used to be Aurand Run. The Alternative 2 Alignment would divert Eagle Creek flood flows during these events through 9.3 stream miles of newly constructed mostly bedrock channel.

   The flow of the Blanchard River would be altered during high water events through the implementation of the Blanchard to Lye Cutoff Levee. The cutoff levee would limit the flow of water due to overbank flow during flood events from the Blanchard River to Lye Creek south of the Findlay Reservoirs.

b. Velocity – Floodwater velocities within the newly constructed channels under both alignments may be high during high water events. The diversion channels are designed to accept flows from Eagle Creek above the two year storm event, which will have a beneficial effect on the lower sections of Eagle Creek during high flow events and the portion of the Blanchard River that flows through the City of Findlay. This may result in a positive effect to some of the natural channels in lower Eagle Creek and the Blanchard River in Findlay (e.g., reduced erosion rates). However, implementation of a diversion channel may result in increased flow velocities downstream where the diversion channel flows into the Blanchard River. Flows below the designed flood event will not be carried through a diversion channel and thus will be dry in the case of Alternative 2 or at preconstruction base flows for the Aurand Run alignment.

   Flows within the Blanchard River between the Blanchard to Lye Cutoff Levee and the confluence of the Blanchard River and Eagle Creek would be greater during high water events through the implementation of the cutoff levee.

c. Stratification – No effect under any of the proposed measures.

d. Hydrologic Regime – As stated in sections 2.2.2a and b, there will be changes to Eagle Creek starting at either of the proposed diversion structures and at the convergence of the respective diversion channel with the Blanchard River downstream of Findlay. The existing hydrologic regime of Aurand Run will be permanently modified with implementation of the Aurand Run Alignment. The hydrologic regimes under the Alignment 2 Alternative and the Blanchard to Lye Cutoff Levee would be altered exclusively during high water events.

2.2.3 *Normal Water Level Fluctuations* – No effect under any of the proposed measures.

2.2.4 *Salinity Gradients* – Not applicable to the proposed measures.

2.2.5 *Actions Taken to Minimize Impacts* –

2.2.5.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – There are limited actions that may be taken to reduce adverse impacts to water circulation, velocity, DO, and eutrophication resulting from the discharge of fill material associated with the Aurand Run Alignment. Such actions include revegetation (for shading) of the diversion channel buffer area, if allowable under USACE policy, and channel design optimization to reduce stream velocity without compromising diversion efficiency.

2.2.5.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – Under the Alternative 2 Alignment, impacts to these water quality factors are expected to be substantially less than under the Aurand Run Alignment due to it being a 'dry' diversion with no permanent base flows. However, if allowable under USACE policy some of the same minimizing options may be employed with Alternative 2 for general water quality and wildlife habitat purposes. Alternative 2 would also seek to minimize impacts during alignment optimization to ensure that the least ecologically sensitive sections of streams are crossed (e.g., narrowest, sections without quality buffer area). Some minimization may also be available through the design of any culverts and/or bridge alignments at stream crossings to minimize erosion/scour and possibly preserve existing streambed. Keeping vegetation removal along the banks to a minimum would also help preserve benthos integrity and encourage re-establishment of any benthos that is disturbed during construction. The contractor would be required to restrict construction activities within the boundaries of the proposed work area and minimize any accidental spillage of materials (e.g., fuel, oil, excavated material) outside of the work area and take appropriate actions in the event of a release.

2.2.5.3 *Blanchard to Lye Cutoff* – Similar to the approach that would be employed under the Alternative 2 Alignment, minimizing vegetation removal along the riparian area of the Blanchard River would help preserve benthos integrity and encourage re-establishment of any benthos that is disturbed during construction. The contractor would be required to restrict construction activities within the boundaries of the proposed work area and minimize any accidental spillage of materials (e.g., fuel, oil, excavated material) outside of the work area and take appropriate actions in the event of a release.

2.3 <u>Suspended Particulate/Turbidity Determinations</u>

2.3.1 *Expected Changes in Suspended Particulates and Turbidity in the Vicinity of the Discharge Site –*

2.3.1.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Construction activities on a temporary basis, and high water events on a periodic basis (i.e., flood events), would result in short-term increases in turbidity within and downstream of either diversion channel alternative. Higher TSS levels resulting from construction activities are expected with the Aurand Run Alignment due to the perennial flow (Aurand Run) that would be taking place in the diversion channel during construction. During flood events, higher than normal TSS presence (compared to base flow conditions) would likely occur under this measure as a result of natural turbidity caused by higher velocity and higher volume flows. Increased TSS resulting from construction activities should dissipate rapidly after construction. The extent of any turbidity plume that might develop during construction would be influenced by stream discharge and velocity conditions at the time of project construction. Turbidity within Eagle Creek downstream of the diversion structure is expected to decrease during high water events compared to the past as a result of project implementation. The Aurand Run Alignment will result in the degradation of Aurand Run, which is currently designated by the OEPA as Warmwater Habitat under the Agency's aquatic life use designations. Water quality impacts resulting from the discharge of fill material associated with either diversion alternative will require Water Quality Certification (WQC), or waiver thereof, from OEPA per Ohio Administrative Code Sections 6111.03(P) & 3745-1.

2.3.1.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – As with the Aurand Run Alignment, short-term construction activities and periodic high water events would result in short-term increases in turbidity within and downstream of either diversion channel alternative. Such TSS impacts during construction of the Alternative 2 Alignment, however, would be much less than those expected under the Aurand Run option and likely isolated to stream crossings, as this would be a 'dry' diversion. During flood events, higher than normal TSS presence (compared to base flow conditions) would likely occur under this measure as a result of natural turbidity caused by higher velocity and higher volume flows. Increased TSS resulting from construction activities should dissipate rapidly after construction. The extent of any turbidity plume that might develop during construction would be influenced by stream discharge and velocity conditions at the time of project construction. Turbidity within Eagle Creek downstream of the diversion structure is expected to decrease during high water events compared to the past as a result of project implementation. No violations of State water quality standards are anticipated under the Alternative 2 Alignment.

2.3.1.3 *Blanchard to Lye Cutoff* – Short-term construction activities and periodic high water events would result in temporary increases in turbidity within and downstream of the proposed cutoff levee. No violations of State water quality standards are anticipated through the implementation of this measure.

2.3.2 *Effects on Chemical and Physical Properties of the Water Column*:

a. Light Penetration – Construction activities for either diversion alignment may temporarily increase turbidity within the closest receiving stream, thus decreasing light penetration. It is expected that a greater impact to this factor would result from the Aurand Run Alignment because it will have a perennial base flow during and following construction. Impacts associated with the Alternative 2 Alignment would be limited to period stream crossings (e.g., culverts, etc). Light penetration would also be expected to be reduced during periodic flood events due to the naturally higher turbidity of flood flows. Light penetration resulting from cutoff levee implementation would be expected to be short-term and limited to construction and high flow events.

b. Dissolved Oxygen – Please refer to Section 2.2.1(g) of this evaluation.

c. Toxic Metals and Organics – No significant effect under any of the proposed measures.

d. Pathogens – No effect expected under any of the proposed measures.

e. Aesthetics – Increased turbidity in the project area during construction and following high water events may be aesthetically displeasing under any of the proposed measures. The creation of a new channel (either alignment) and the subsequent reduction of riparian vegetation (Aurand Run Alignment) may be viewed negatively by some as compared to pre-project conditions. The Aurand Run Alignment would also likely result in the largest adverse aesthetic impact because of the loss of natural stream corridor (Aurand Run) and impacts to the Oakwoods Nature Preserve (Hancock County Parks).

2.3.3 *Effects on Biota*:

a. Primary Production and Photosynthesis – Primary production and photosynthesis within Aurand Run may be reduced during construction under the Aurand Run Alignment. However, there could be a slight increase in primary production and photosynthesis within the Aurand Run diversion channel (post project) as a result of stream base flows being exposed to a slightly higher amount of sunlight due to the removal of some riparian vegetation. Any increase to primary production though would likely be moderated or possibly eliminated by the loss of aquatic habitat, stream structure, and aquatic biota due to the replacement of the Aurand Run channel with a new bedrock-lined channel. Primary production and photosynthesis under the Alignment 2 Alternative would likely be insignificant, as this measure would be comprised of a dry channel outside of high water events. It is not expected that any significant effect on primary production or photosynthesis would occur due to the implementation of the proposed levee.

b. Suspension/Filter Feeders – A temporary reduction in feeding for suspension and filter feeders would occur during construction as well as during subsequent periodic high water events due to increased turbidity under the Aurand Run Alignment as compared to existing conditions. No negative effects to suspension/filter feeders are expected to

occur under the Alignment 2 Alternative, as this would be a 'dry' diversion channel outside of high water events. The creation of the Blanchard to Lye Cutoff Levee would also lead to short-term reductions in suspension and filter feeding activities in the vicinity of the proposed measure, as would periodic high water events. See also Section 2.5.6 of this evaluation regarding mussels.

c. Sight Feeders – A temporary impairment in feeding for sight feeders would occur during construction and during periodic high water events under the Aurand Run Alignment as compared to existing condition in Aurand Run due to temporary increases in turbidity. The same would be expected through implementation of the Alternative 2 Alignment and/or the Blanchard to Lye Cutoff Levee.

2.3.4 *Actions Taken to Minimize Impacts –*

2.2.5.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – There are limited actions that may be taken to reduce adverse impacts adverse impacts to biota and the physical/chemical properties of water as a direct or indirect result of the discharge of fill material associated with the Aurand Run Alignment. Such actions include revegetation (for shading) of the diversion channel buffer area, if allowable under USACE policy, and channel design optimization to reduce stream velocity without compromising diversion efficiency. Keeping vegetation removal along the banks to a minimum would also help reduce long term turbidity. The contractor would be required to restrict construction activities within the boundaries of the proposed work area and minimize any accidental spillage of materials (e.g., fuel, oil, excavated material) outside of the work area and take appropriate actions in the event of a release. All disturbed soil areas would be immediately seeded and planted with appropriate native plant species to provide/ vegetative cover and reduce riparian erosion. Equipment access and work within Aurand Run may be restricted to a period from June 16 to February 28 provided low flows persist.

2.2.5.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – Under the Alternative 2 Alignment, impacts to these water quality factors are expected to be substantially less than under the Aurand Run Alignment due to it being a 'dry' diversion with no permanent base flows. However, if allowable under USACE policy some of the same minimizing options may be employed with Alternative 2 for general water quality and wildlife habitat purposes. Alternative 2 would also seek to minimize impacts during alignment optimization to ensure that the least ecologically sensitive sections of streams are crossed (e.g., narrowest, sections without quality buffer area). Some minimization may also be available through the design of any culverts and/or bridge alignments at stream crossings to minimize erosion/scour and possibly preserve existing streambed. Keeping vegetation removal along the banks to a minimum would also help preserve benthos integrity and encourage re-establishment of any benthos that is disturbed during construction. The contractor would be required to restrict construction activities within the boundaries of the proposed work area and minimize any accidental spillage of materials (e.g., fuel, oil, excavated material) outside of the work area and take appropriate actions in the event of a release.

2.2.5.3 *Blanchard to Lye Cutoff* – Similar to the approach that would be employed under the Alternative 2 Alignment, minimizing vegetation removal along the riparian area of the Blanchard River would help preserve benthos integrity and encourage re-establishment of any benthos that is disturbed during construction. The contractor would be required to restrict construction activities within the boundaries of the proposed work area and minimize any accidental spillage of materials (e.g., fuel, oil, excavated material) outside of the work area and take appropriate actions in the event of a release.

2.4 Contaminant Determinations – Construction materials for the proposed measures would not introduce, relocate, or increase any contaminants within the project area. The results of the various environmental baseline surveys (e.g., HTRW) will be consulted in order to avoid placing the diversion channel through contaminated areas.

2.5 Aquatic Ecosystems and Organisms Determinations

2.5.1 *Effects on Plankton* – Primary productivity within Aurand Run and the Blanchard to Lye Cutoff Levee may increase over baseline conditions following implementation of the Aurand Run Alignment due to increased exposure of the stream to sunlight. The Alternative 2 Alignment is not expected to have any effect on plankton.

2.5.2 *Effects on Benthos* – Reference section 2.1.4

2.5.3 *Effects on Nekton* – Free-swimming aquatic organisms would temporarily avoid the project area during construction of the Aurand Run Alignment. However, with the permanent excavation and elimination of the natural stream it is uncertain how easily the project area might be avoided by such organisms. The Alternative 2 Alignment is not expected to have any effect on nekton except temporary impacts at localized stream crossings due to increased turbidity. The Blanchard to Lye Cutoff Levee is also expected to incur only short-term negative effects to nekton during project construction.

2.5.4 *Effects on Aquatic Food Web* – There will likely be a permanent adverse impact to the aquatic food web in the event the Aurand Run Alignment were implemented. Negligible effects are anticipated as a result of the Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee. The Aurand Run Alignment will permanently impact the benthos of Aurand Run (Section 2.1.4) as well as other aquatic organisms (Section 2.5). Impacts to the aquatic food web should also be considered for the riparian corridor as a whole for Aurand Run, which includes the loss of 106.29 to 127.83 acres of wetland and the resultant loss of ecological integrity. Although there may be some recolonization of benthos within the new Aurand Run diversion channel after construction, this is expected to be far inferior in quality (e.g., species diversity, habitat structure) to pre-project conditions in Aurand Run.

2.5.5 *Effects on Special Aquatic Sites*:

a. Sanctuaries and Refuges – Construction of the Aurand Run Alignment would impact the Oakwoods Nature Preserve, a Hancock County Park. The Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee are not proposed to impact any sanctuaries of refuges

b. Wetlands – Based on the NWI/OWI dataset, 106.29 to 127.83 acres of wetlands will be impacted as a result of the construction of the Aurand Run Alignment, and 6.28 to 10.78 acres of wetlands would be impacted with construction of the Alternative 2 Alignment (Table 1.1). Impacts to wetlands through the implementation of the Blanchard to Lye Cutoff Levee are expected to include less than one acre. Wetland impacts would be a result of direct fill placement and potential drainage effect.

c. Mud Flats – Not applicable under any of the proposed measures.

d. Vegetated Shallows – Not applicable under any of the proposed measures.

e. Coral Reefs – Not applicable under any of the proposed measures.

f. Riffle and Pool Complexes – The construction of the Aurand Run Alignment will permanently eliminate riffle/pool complexes in portions of the lower half of Aurand Run (e.g., mostly between Norfolk and Southern Railway and SR 12) and perhaps at the beginning of the diversion channel in Eagle Creek. Aurand Run is currently designated by the OEPA as Warmwater Habitat under the Agency's aquatic life use designations. It is not expected that the Alternative 2 Alignment or the cutoff levee would disrupt any riffle/ pool complexes except for perhaps at the beginning of the diversion channel in Eagle Creek.

2.5.6 *Threatened and Endangered Species* – The proposed project is within the range of the federally endangered Indiana bat and the northern long-eared bat, a candidate for federal listing. These species have similar habitat preferences and utilize live or dead trees or snags with peeling/exfoliating bark and cavities that occur within the vicinity of stream corridors and riparian areas as well as upland woodlots. In 2009, the USFWS recommended that habitat and surrounding trees that fit the above-mentioned criteria be saved whenever possible. It is likely that areas which meet the habitat preferences of this species will be impacted under either alignment, especially under the Aurand Run Alignment, where a total of approximately 3.4 miles of forested stream corridor would be impacted. The USACE has been coordinating with the USFWS on conducting Indiana bat habitat surveys and will continue to do so regarding the likely future need for additional survey work. While impacts may occur to forests through the implementation of the cutoff levee, the layout of this levee may minimize or avoid impacts to forested areas.

The proposed project in Hancock County lies within the range of the clubshell (*Pleurobema clava*) and the rayed bean (*Villosa fabalis*), which are both federally endangered freshwater mussels. The clubshell inhabits areas with sand or gravel substrate and also prefers areas with riffles and runs. The rayed bean is generally known to occur in smaller, headwater creeks, but records do exist in larger rivers. It is usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.).

Mussel surveys were conducted in 2009 at six locations in the Blanchard River and two locations within Eagle Creek, in the vicinity of Findlay, Ohio by Hoggath and Burgess. This survey uncovered 29 mussel species in the Blanchard River and seven in Eagle Creek. No live or freshly expired clubshell of rayed bean individuals were detected, however, weathered and subfossil shells of both species were found downstream of Findlay in the Blanchard River. While the mussel surveys did not find clubshell and rayed bean, they were not necessarily conducted in the locations where impacts as a result of measure implementation would be expected to occur. Therefore, additional mussel surveys may be necessary in the vicinity of the proposed diversion alignments. The cutoff levee is not expected to incur impacts to the nearby Blanchard River, and therefore is not expected to impact mussels.

The entire project area lies within the range of the bald eagle (*Haliaeetus leucocephalus*). While this species has been removed from the federal list of endangered and threatened species due to recovery, it continues to be afforded protection by the Bald and Golden Eagle Protection Act and Migratory Bird Protection Act. Current known locations of Bald Eagle nests provided by the USFWS Ohio Field Office do not include nests within 660 feet of any of the proposed measures. Nevertheless, the USACE will contact the Ohio Department of Natural Resources, Division of Wildlife, and the USFWS to ensure that no new nests are active within the vicinity of the proposed project leading up to construction.

2.5.7 *Other Wildlife* – Disruption and disturbance by equipment during construction activities across all project measures would likely result in a short-term avoidance of the project area by local wildlife species. It is also expected that some habitat loss will occur for species that utilize wetlands and forested areas, where these habitat types are expected to incur impacts. Overall, these impacts are not expected to be significant in area.

2.5.7.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Approximately 3.4 miles of forested stream corridor would be impacted through the implementation of the Aurand Run Alignment. This measure will also increase the extent of terrestrial and aquatic habitat fragmentation in the area south and west of Findlay. Such fragmentation is likely to cause disruption to terrestrial wildlife movement between either side of the diversion channel. It may also result in some natural areas along Aurand Run, the Blanchard River and Eagle Creek becoming more susceptible to exotic/invasive plant species establishment.

2.5.7.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – No significant wildlife habitat is expected to be impacted under the Alternative 2 Alignment. This diversion option would also increase the extent of terrestrial and aquatic habitat fragmentation in the area south and west of Findlay, although it would be expected to be less than that exhibited under the Aurand Run Alignment. Nevertheless, this fragmentation is likely to cause disruption to terrestrial wildlife movement between either side of the diversion channel. It may also result in some natural areas along Aurand Run, the Blanchard River and Eagle Creek becoming more susceptible to exotic/invasive plant species establishment.

2.5.7.3 *Blanchard to Lye Cutoff* – The level of impacts to wildlife species associated with the Blanchard to Lye Cutoff Levee would be directly related to the ability to avoid forest and wetland impacts when siting the specific levee location. While these impacts are not expected to be significant, the USACE will make every effort to avoid impacts to wildlife habitat the extent practicable.

2.5.8 *Actions Taken to Minimize Impacts* – As a standard practice, the contractor performing the work would be required to keep their activities under surveillance to minimize interference and disturbance to local fish and wildlife populations. The contractor would be required to restrict construction activities to within the boundaries of the proposed work area, and to take actions to minimize the likelihood of accidental spillage of materials outside of the work area. All disturbed soil areas would be immediately seeded with appropriate native grass or other plant species to provide/replace vegetative cover to reduce further erosion into local surface waters. Pending further coordination with natural resource agencies, equipment access and in-stream work would only be allowed during the period from June 16 to February 28. While this time frame includes the active season for the federally endangered Indiana bat, every effort would be made to preserve suitable habitat and surrounding trees within the project area, where possible. Important tree features for this species include (1) dead or living trees and snags with exfoliating or peeling bark, split branches and/or tree trunks of cavities, and (2) live trees which exhibit exfoliating bark. If trees fitting these criteria must be cut, further coordination with the USFWS would be required to determine if Indiana bat surveys are warranted. Impacts to the federally endangered snuffbox and/or the rayed bean are not expected as a result of project implementation, as these species were not detected during the mussel surveys conducted in the vicinity of the project area. The Buffalo District may need to complete mussel surveys if adequate habitat for either of these species exists within Aurand Run. Coordination will be completed with ODNR to identify any potential for impacts to bald eagles that may be nesting in the project vicinity.

2.5.8.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – There are only limited actions that may be taken to reduce permanent adverse impacts to wildlife populations, special aquatic sites, and the food web as a direct or indirect result of the discharge of fill material associated with the Aurand Run Alignment. Such actions may be limited to construction best management practices, as the Aurand Run Alignment will permanently eliminate most of the natural Aurand Run stream channel and 106.29 to 127.83 acres of adjacent wetland. Any additional actions may be limited to revegetation (for shading) of the diversion channel buffer area, if allowable under USACE policy, and channel design optimization to possibly reduce the amount of stream/wetland impact area.

2.5.8.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – Under the Alternative 2 Alignment, direct or indirect discharge of fill impacts are expected to be substantially less than under the Aurand Run Alignment due to it being a ‘dry’ diversion with no permanent base flows and only periodic stream crossings. However, some of the same minimizing options may be employed with Alternative 2 for general water quality and wildlife habitat purposes. Alternative 2 would also seek to minimize impacts during alignment

optimization to ensure that the least ecologically sensitive sections of streams are crossed (e.g., narrowest, sections without quality buffer area). Further minimization in Alternative 2 may also be possible through the design of any culverts and/or bridge alignments at stream crossings to minimize erosion/scour and possibly preserve existing streambed. Keeping vegetation removal along the banks to a minimum would also help reduce long term turbidity.

2.5.7.3 *Blanchard to Lye Cutoff* – The implementation of this measure is not expected to introduce a significant amount of fill material within the nearby ponds and wetlands. There are less than one acre of impacts expected and siting the levee to avoid these impacts will take place to the extent practicable. No fill is expected to be placed within the Blanchard River through the implementation of this measure.

2.6 Proposed Discharge Site Determinations

2.6.1 *Mixing Zone Determination* – Not applicable under any of the proposed measures.

2.6.2 *Determination of Compliance with Applicable Water Quality Standards* –

2.6.2.1 *Western Diversion of Eagle Creek – Aurand Run Alignment* – Turbidity within Eagle Creek downstream of the diversion structure is expected to decrease during high water events compared to the past as a result of project implementation. This alignment will result in the degradation of Aurand Run, which is currently designated by OEPA as Warmwater Habitat under the Agency's aquatic life use designations. Water quality impacts resulting from the discharge of fill material associated with either diversion alternative will require Water Quality Certification (WQC), or waiver thereof, from OEPA per Ohio Administrative Code Sections 6111.03(P) & 3745-1. See also Section 2.3.1.

2.6.2.2 *Western Diversion of Eagle Creek – Alternative 2 Alignment* – As with the Aurand Run Alignment, this measure would see a decrease in turbidity within Eagle Creek downstream of the diversion structure during high water events compared to the past as a result of project implementation. No violations of state water quality standards are anticipated under the Alternative 2 Alignment.

2.5.7.3 *Blanchard to Lye Cutoff* – While some impacts to ponds and wetlands may occur, it is not expected that state water quality standards would be violated through the implementation of this measure.

2.6.3 *Potential Effects on Human Use Characteristics*:

a. Municipal and Private Water Supply – No effect expected under any of the proposed measures.

b. Recreational and Commercial Fisheries – Construction activities would likely cause local fish species within Aurand Run to temporarily avoid the project area. However, it is unclear how easily such species might avoid the construction areas, as most of Aurand Run would be excavated to bedrock. It is possible that they could exit

Aurand Run into the Blanchard River to avoid construction activities, but this might compromise some fish species that are endemic to smaller, first order streams. Significant adverse impacts on spawning, nursery, and feeding activities of local fish species are not anticipated though, especially since the majority of the work involved with the Aurand Run Alignment would take place during low flow periods outside of any major spawning season. Pending further coordination with ODNR and USFWS, in-water work may be restricted to low flow periods between June 16 and February 28. Fishing opportunities and the quality of the fishery in the Blanchard River is not expected to change as a result of either western diversion channel alternative. The Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee are not expected to negatively affect recreational or commercial fisheries.

c. Water-Related Recreation – There is little to no water-related recreation that occurs in Aurand Run other than passive ecotourism activities where the stream passes through the Oakwoods Nature Preserve. Riparian corridor modifications from the Aurand Run Alignment within this preserve are likely to adversely affect such recreational opportunities. There are no anticipated adverse impacts to water-related recreation associated with the Alternative 2 Alignment or the Blanchard to Lye Cutoff Levee.

d. Aesthetics – Increased turbidity in the project area during construction and following high water events may be aesthetically displeasing under either alignment. The creation of a new channel (either alignment) and the subsequent reduction of riparian vegetation (Aurand Run Alignment) may be viewed negatively by some as compared to pre-project conditions. The Aurand Run Alignment would also likely result in the largest adverse aesthetic impact because of the loss of natural stream corridor (Aurand Run) and impacts to the Oakwoods Nature Preserve (Hancock County Parks). The Blanchard to Lye Cutoff Levee would include viewshed impacts within the immediate vicinity of the proposed measure. The presence of construction equipment and associated work areas under either alignment as well as the cutoff levee would be likely to temporarily detract from the local aesthetic qualities of the project area.

e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves – There are 23 parks and recreation areas that occur within the project area (see section 4.1.18 of the Integrated Feasibility Report for more information). The implementation of the either diversion alternative and the Blanchard to Lye Cutoff Levee are expected to incur moderate, long-term benefits to recreation within Findlay, as it would alleviate flooding impacts in 13 parks in the area.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem – A cumulative impact is defined as resulting "from the incremental impact of the action when added to other past, present, or reasonably foreseeable future action regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR Parts 230.11(g) & 1508.7). Such

impacts can result from individually minor, but collectively significant actions taking place over a period of time. Evaluations of cumulative impacts include consideration of the proposed action with known past and present actions, as well as reasonably foreseeable future actions. In assessing cumulative effects, the key determinant of importance or significance is whether the incremental effect of the proposed action will alter the sustainability of resources when added to other present and reasonably foreseeable future actions. Implementation of any of the proposed flood risk management measures would benefit Findlay residence in a sustainable way in the form of flood damage reduction.

Cumulative environmental effects for the proposed project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ). This guidance provides an eleven-step process for identifying and evaluating cumulative effects during NEPA analyses. The overall cumulative impact of the proposed project is considered to be environmentally, socially, and economically beneficial.

An information request was made to local, state and Federal agencies concerning historical, current and reasonable foreseeable projects that may present impacts that may be additive in nature when viewed in the context of the proposed project. Agencies contacted include the USFWS, ODNR, OEPA, ODOT, Ohio SHPO, the Ohio Office of Workforce Development (OOWD), as well as public officials with Hancock County. Actions by USACE and other agencies/entities within the Blanchard River Watershed include, but are not limited to:

- *Blanchard Six Mile Diversion Extension Project* – A potential diversion channel extension is being considered by the local interests and is not required as part of the Blanchard River Project being proposed at the Federal level. This project would serve to reduce flooding within Findlay by diverting Blanchard River flows upstream of State Route 15 westward across Eagle and Lye Creeks, which would tie into the western diversion proposed as part of the present Blanchard River Project when above the two-year flood stage. The implementation of the Blanchard Six Mile Diversion Project would further reduce flood risk in theCity of Findlay and would not have any negative impact on the implementation of the present project, as the western diversion associated with the federal project would be designed to account for the increased flows associated with the six mile diversion.

- *Ottawa Flood Risk Management Project* – This project would be implemented by the Village of Ottawa, occurring approximately 24 river miles downstream of Findlay. This project would include the removal of a portion of the I-9 Bridge embankment, realignment of the Blanchard River to cut off a meander just upstream of the I-9 Bridge and nonstructural measures offering flood protection to the ten year level. The implementation of this project would further reduce flood risk in the Village of Ottawa and is not expected to have any negative impact on the implementation of the present project in Findlay or other areas of the Blanchard River Watershed. Potential impacts to social, environmental and cultural resources associated with this diversion would be similar to those expected for the western diversion associated with the federal project.

These impacts are not discussed in detail within this document as they are outside of the scope of the present EIS.

- *Flood Debris Removal in the Blanchard Watershed* – The OOWD secured and facilitated National Emergency Grants from the U.S. Department of Labor to enable the removal of flood debris from public lands and waterways and to assist with repair and cleaning or demolition of damaged public structures and facilities that occur as a result of significant flooding events (Collins, personal communication, 2014). These efforts include waterway tree and other debris clearing, which serve to provide a level of flood levels reduction within the Blanchard River Watershed. It is important to note that these efforts are in response to flood events and would decrease or cease entirely if flood damages within the watershed were decreased or alleviated.

- *Nutrient Reduction Project* – The Upper Blanchard Watershed Nutrient Reduction Project is an initiative lead by the Blanchard River Watershed Partnership. This effort targets agricultural nutrient reduction through the use of BMPs that reduce sediment and nutrient loading as well as manure pollution, replacing failing residential septic systems, conduct riparian restoration and the overall improvement of water quality in the Blanchard River Watershed. While there would be some negative impacts to this effort during the construction of the proposed project, impacts to the Nutrient Reduction Project would likely end upon the completion of the proposed project.

- *Road and Highway betterments* – The Ohio Department of Transportation is planning on making improvements to Interstate 75 through Findlay, which would include the Route 15/Interstate 75 interchange. The timing of this project may lead to additive impacts to water quality through sediment erosion within the Blanchard Watershed if it coincides with construction of the flood risk management measures associated with the present project. It is expected that these impacts would occur over the short term and that the construction associated with this project would include the use of BMPs to minimize impacts to water quality.

- *The Lye Creek Ecosystem Restoration Project* – The USACE Buffalo District is presently looking into the feasibility of implementing an Ecosystem Restoration Project within the Upper Blanchard River Watershed. The potential project would look to restore and sustain riparian ecosystem structure and function, resurge natural hydrology and in-stream hydrologic functions and restore habitat suitability and connectivity for aquatic and terrestrial species. The project is scalable, and would include the restoration of approximately 23 acres of headwater streams, encompassing approximately 435 acres if implemented. It is expected that this project may incur short-term impacts on the present project during the construction phase. These impacts would potentially include increased

erosion and turbidity, however, BMPs including the use of siltation barriers to prevent sediment flow into nearby waterways would minimize impacts to the present project.

2.8 Determination of Secondary Effects on the Aquatic Ecosystem – Secondary effects on the aquatic environment would occur mainly as a result from implementation of the Aurand Run Alignment. Such impacts are likely to include adverse impacts to riparian wetland hydrology (106.29 to 127.83 acres) as a result of the close proximity of the excavated diversion channel (e.g., drainage effects). Additionally, permanent impacts to the long term ecological integrity of Aurand Run can be expected following construction of an Aurand Run Alignment (e.g., loss of function, reduced diversity and DO, habitat loss, and reduced water clarity). No significant adverse secondary effects on the aquatic ecosystem would be expected to occur from implementation of the Alignment 2 Alternative, although it too will result in the adverse impact to the hydrology of some adjacent wetland areas (6.28 to 10.78 acres). The Blanchard to Lye Cutoff Levee is also not expected to incur significant adverse secondary effects on the aquatic ecosystem. Limited impacts of 0.81 acres to wetlands are expected to occur through the implementation of this measure and may be reduced through slight changes to the proposed layout of the levee.

FINDING OF COMPLIANCE

BLANCHARD RIVER FLOOD RISK MANAGEMENT PROJECT

HANCOCK COUNTY, OHIO

1. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation other than its limited application to only a component of the overall federal flood damage reduction study.

2. Two alternative plans were evaluated for the western diversion of Eagle Creek to the Blanchard River. Both plans would result in Eagle Creek flood waters bypassing the City of Findlay. The Aurand Run Alignment would incur a permanent impact to over 35,157 linear feet of relatively intact stream and roughly 3.4 miles of associated forested riparian corridor. The Alternative 2 Alignment would result in the permanent impact of 6.28 to 10.78 acres of riparian wetland and approximately 5,507 linear feet of stream. A cutoff levee was also evaluated that would limit the overflow of waters from the Blanchard River to Lye Creek. This measure would incur less than one acre of wetland impacts, with the potential to reduce impacts through potential siting updates during the preconstruction engineering and design (PED) phase. No stream impacts are expected through the implementation of this measure.

3. The Aurand Run Alternative would likely lead to a decrease in the OEPA aquatic life use designation of Aurand Run and will likely not comply with applicable state water quality standards. It is anticipated at this time that both the Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee, if considered separately from the Aurand Run Alternative, would not violate applicable state water quality standards.

4. The Aurand Run Alignment could incur impacts to approximately 3.4 stream miles of forested stream corridor that may serve as foraging and/or roosting habitat for the federally endangered Indiana bat. Both the Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee would not likely impact any potential habitat for federally threatened or endangered species or their designated critical habitat.

5. Both alignment alternatives would result in adverse impacts to special aquatic sites. The Aurand Run Alignment would impact over 35,157 linear feet of stream (including riffle/pool complexes) and approximately 106.29 to 127.83 acres of wetland. The Alternative 2 Alignment would impact 6.28 to 10.78 acres of wetland and about 5,507 linear feet of stream channel. The Blanchard to Lye Cutoff Levee could impact up to one acre of wetlands, although this amount can be may be reduced during the project's PED phase. The Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee would not result in significant adverse effects on human health, municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, or wildlife.

6. Appropriate steps to minimize adverse impacts of the fill discharge on aquatic systems would be taken as part of the Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee. During construction, the contractor would be required to minimize turbidity and accidental spills of fuels, oils, and/or greases, and take appropriate actions in the event of a release. All disturbed soil areas would be immediately seeded with appropriate grass species or other plants to provide/replace

vegetative cover to reduce erosion into the Blanchard River. Equipment access and in-stream work may be restricted to a period from June 16 to February 28.

7. According to guidance set forth in the 40 CFR Part 230.10, Subpart B of the Clean Water Act Section 404(b)(1) Guidelines, , "no discharged of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.". The Aurand Run Alignment would permanently impact over 35,157 linear feet of stream and at least 106.29 acres of wetland. Analysis of Alignment 2 indicates that it would be equally effective hydraulically as the Aurand Run Alignment, be less expensive to construct, and would require impacts of 6.28 to 10.78 acres of wetland and a total of 5,507 linear feet of stream. Therefore, the Aurand Run Alignment is not compliant with this Act, as it would not constitute the LEDPA. Furthermore, the USFWS objects to the implementation of the Aurand Run Alignment, as this measure would effectively convert sections of Aurand Run “from a Warmwater Habitat stream to a flood control channel”, and that the implementation of the Aurand Run alignment “would drastically alter aquatic habitat in Aurand Run and result in severe impacts to aquatic biota”. Both the Alternative 2 Alignment and the Blanchard to Lye Cutoff Levee are in compliance with these guidelines and recommendations, with the inclusion of appropriate and practical conditions to minimize adverse impacts wherever possible and comply with applicable and appropriate regulatory requirements (e.g., compensatory mitigation).

2.0 Threatened and Endangered Species

2.1 Coordination with the US Fish and Wildlife Service

Fish and Wildlife Coordination Act Report
Section 2(b)

Blanchard River Watershed, Ohio
Interim Feasibility Study for Flood Risk Management in Findlay and Ottawa, Ohio

Prepared for: U.S. Army Corps of Engineers Buffalo District, Buffalo, NY

Prepared by: Department of the Interior, U.S. Fish and Wildlife Service, Ohio Field Office, Columbus, Ohio

Preparer: Jeromy Applegate, Fish and Wildlife Biologist

June 25, 2014

I. Executive Summary

The Blanchard River Watershed Study is being conducted to address the justification of providing flood damage risk reduction to the metropolitan areas of Findlay and Ottawa. Significant flooding in Findlay and the downstream village of Ottawa has occurred multiple times over the last decade. The March 2013 USACE document, "Report Synopsis, Final Array of Plans, Blanchard River Watershed, Ohio: Interim Feasibility Study for Flood Risk Management in Findlay and Ottawa, Ohio" addresses the final array of options to address flooding in each town. Projects under consideration in Findlay include westward diversion of Eagle Creek, a levee to block flood flows from diverting from the Blanchard River to Lye Creek, an in-line detention in Eagle Creek, and non-structural alternatives. Projects under consideration in Ottawa include modification of the I-9 embankment, diversion of the Blanchard River, off-line detention basins, and non-structural alternatives. Habitat restoration is also being considered.

Fish and wildlife resources in the project areas include suitable habitat for federally listed and proposed species (Indiana bat, northern long-eared bat, clubshell, rayed bean). Other fish and wildlife resources in the project areas include bald eagles, migratory birds, freshwater mussels, riparian forest, streams, wetlands, fish and macroinvertebrates. Impacts to these resources can result from alternatives that involve in-water work in streams and wetlands, forest clearing, and work near bald eagle nests. Acquisition of flood plain parcels presents and opportunity for habitat restoration.

The Service recommends that impacts to the Blanchard River, Eagle Creek, wetlands, and riparian forest be avoided and minimized to the maximum extent possible. We object to a westward diversion of Eagle Creek via Aurand Run and an in-line detention of Eagle Creek. We recommend conducting appropriate mussel surveys prior to project construction and consulting with the Service and ODNR on listed species impacts. We support maximizing floodplain habitat restoration.

II. Introduction

The Blanchard River Watershed Study is being conducted to address the justification of providing flood damage risk reduction to the metropolitan areas of Findlay and Ottawa. Concurrent evaluations are being made for environmental restoration. This study was undertaken by the U.S. Army Corps of Engineers (Corps) as part of a watershed initiative under Section 441 of the Water Resources Development Act of 1999. The Blanchard River watershed feeds the Maumee River, which flows into Lake Erie in northwestern Ohio. The Blanchard River watershed is characterized by nearly flat terrain supporting large areas of agriculture and a sparse population. The Blanchard

River, Eagle Creek and Lye Creek all converge in the City of Findlay. Significant flooding in Findlay and the downstream Village of Ottawa has occurred multiple times over the last decade. The March 2013 Corps document, "Report Synopsis, Final Array of Plans, Blanchard River Watershed, Ohio: Interim Feasibility Study for Flood Risk Management in Findlay and Ottawa, Ohio" (Interim Report) addresses the final array of options to address flooding in each town.

This Fish and Wildlife Coordination Act Report (FWCAR) constitutes the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). It describes potential impacts to fish and wildlife resources resulting from flood risk management alternatives identified in the Interim Report. In addition, this FWCAR recommends measures to conserve and protect fish and wildlife resources in light of those impacts.

III. Description of the Project Area

The project areas consist of the Blanchard River, Lye Creek, Eagle Creek, Aurand Run and surrounding uplands in the City of Findlay in Hancock County and the Blanchard River, and surrounding uplands in the Village of Ottawa in Putnam County. Findlay and Ottawa are separated by approximately 30 miles, and flood risk management opportunities are addressed separately for each of these two municipalities. The Blanchard River watershed is a very flat, largely agricultural landscape. Approximately 6% of the watershed is forested. Much of the watershed was formerly part of the Great Black Swamp. Additional background information regarding the Blanchard River watershed is detailed in the Interim Report and the Service's August 2009 Planning Aid Letter for this study.

IV. Project Description

The Flood Risk Management Alternatives identified in Section 8.5 of the Interim Report are presented below. Although Section 8.8 of the Interim Report indicates that some of these alternatives have been eliminated from the Final Array, discussions between the Service and the Corps indicate that some of these options may still be under consideration (e.g., West Diversion of Eagle Creek -- Aurand Run Alignment). Therefore, this FWCAR will evaluate all of the alternatives identified in Section 8.5 the Interim Report, not just those included in the Final Array.

Findlay

Westward Diversion of Eagle Creek

The Final Array of plans includes two potential alignments for a diversion channel that would direct high flows in Eagle Creek westward around the City of Findlay, into the Blanchard River

downstream of Findlay, thereby reducing flood flows in the City of Findlay. Low flows would continue to flow downstream of the diversion channel through Eagle Creek. Both alignments would include an inline earthen dam, a low flow outlet, diversion outlets, and a concrete spillway.

One alternative diversion channel route (F1a) follows the current path of Aurand Run, a perennial tributary of Blanchard River. The diversion channel would be approximately 220 feet wide and 7.7 miles long. It would divert flow from Eagle Creek downstream of Township Road 49 and discharge to the Blanchard River west of County Road 139.

The other alternative diversion route (F1b) would be routed across agricultural land. The diversion channel would be approximately 175 wide and 9.3 miles long. It would divert flow from Eagle Creek approximately 1,300 feet downstream of County Road 45 and discharge into the Blanchard River west of the Township Road 130.

Eagle Creek In-line Detention

The Eagle Creek In-line Detention structure would consist of a dry detention dam on Eagle Creek at County Road 45. It would be approximately 4,240 feet long, 25 feet wide (top width) and 26 feet high. It would not permanently impound water. No details regarding frequency, duration, or area of water impoundment were given in the Interim Report.

Modification of the Norfolk & Southern Railroad Bridge

The Norfolk –Southern Bridge would be elevated and widened. No details regarding this option were given in the Interim Report.

Blanchard to Lye Diversion Cutoff

The Blanchard to Lye Diversion Cutoff would consist of an earthen levee across the existing floodwater flow path from the Blanchard River to Lye Creek. The embankment would be approximately 9,800 feet long, 5 feet high, with a 10-foot top width. The levee would be located on the west side of the Blanchard River, from approximately State Route 15 north to past County road 205. Exhibit F2 in the Interim Report identifies the entire area between the levee and the Blanchard River as “Potential Borrow, Mitigation, and Restoration Area” but the Report does not elaborate. The Levee would delay peak flow through Findlay by up to five hours.

Ottawa

Off-line Storage Areas

Several areas have been identified off-line (i.e., not in the stream channel) storage areas. These sites are located adjacent to the Blanchard River between Findlay and Ottawa. The storage areas

would require approximately 20,000 linear feet of 10-foot high levee and would be designed to capture Blanchard River flood flows from a 10 to 25 year event.

Modification of the I-9 Bridge Embankment

The I-9 bridge downstream of Ottawa has a high approach ramp and embankment that currently impedes movement of flood flows downstream of Ottawa. This alternative would remove a portion of the embankment, thereby reducing upstream flood elevations.

Channel Realignment

This alternative consists of a high-flow (10-25 year flood event) diversion channel, upstream of the I-9 bridge, to reduce flood elevations upstream of the I-9 bridge. The diversion channel would be approximately 0.75 mile long, 20 feet wide, and 24 feet deep, and would extend from downstream of the Elm Street Bridge to the I-9 Bridge. It would cross a large agricultural field. It would cut off access to an approximately 180-acre agricultural parcel. This parcel is being considered for ecosystem restoration.

Alternatives common to both Findlay and Ottawa

Non-structural Mitigation

Non-structural mitigation is a component of most of the Flood Risk Management alternatives, and consists of elevation/flood-proofing of flood prone structures, or acquisition and demolition of flood prone structures.

V. Fish and Wildlife Resources

Federally Listed Species

Section 7 of the Endangered Species Act (ESA) requires Federal agencies to use their legal authorities to promote the conservation purposes of the ESA and to consult with the Service, as appropriate, to ensure that effects of actions they authorize, fund, or carry out will not jeopardize the continued existence of listed species. The following federally listed species are present or potentially present within the project areas.

Indiana Bat

All of the project areas lie within the range of the Indiana bat (Myotis sodalis), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees.

Fragmentation of forest habitat may also contribute to declines. Most recently white-nose syndrome (WNS), a novel fungal pathogen, has caused serious declines in the Indiana bat population in the northeastern U.S. WNS has also been documented in Ohio and declines of Indiana bats during winter censuses have been noted, but the full extent of the impacts from WNS in Ohio are not yet known.

During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:
(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

Northern Long-eared Bat

All of the project areas lie within the range of the northern long-eared bat (*Myotis septentrionalis*), a species that is currently proposed for listing as federally endangered. Recently, white-nose syndrome (WNS), a novel fungal pathogen, has caused serious declines in the northern long-eared bat population in the northeastern U.S. WNS has also been documented in Ohio, but the full extent of the impacts from WNS in Ohio are not yet known.

During winter, northern long-eared bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:
(1) Roosting habitat in dead or live trees and snags with cavities, peeling or exfoliating bark, split tree trunk and/or branches, which may be used as maternity roost areas;
(2) Foraging habitat in upland and lowland woodlots and tree lined corridors;
(3) Occasionally they may roost in structures like barns and sheds.

Rayed Bean

The projects in the Blanchard River in Hancock County lie within the range of the **rayed bean** (*Villosa fabalis*), a federally listed endangered species. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). Populations of rayed bean have been documented in the Blanchard River upstream of Findlay, and they may be present in the vicinity of the proposed projects in the Blanchard River in Hancock County.

Clubshell

The projects in the Blanchard River in Hancock County lie within the range of the **clubshell** (*Pleurobema clava*), a federally listed endangered freshwater mussel. The clubshell inhabits areas with sand or gravel substrate and also prefers areas with riffles and runs. Weathered dead shells of the clubshell have been found recently in the Blanchard River in Hancock County, and the species may still be extant in the River in Hancock County.

Other Fish and Wildlife Resources

Ohio Department of Natural Resources interdisciplinary review

See Appendix A for an interdisciplinary review of the Interim Report by the Ohio Department of Natural Resources (ODNR). The ODNR review comments in Appendix A are hereby incorporated into this FWCAR.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a species protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In Ohio, eagles generally begin courtship and mating in January, lay eggs in February, and the eggs hatch in March or April. The young eagles remain in the nest until approximately the end of July, after which time they leave the nest and become independent. There are four known bald eagle nests along the Blanchard River in the vicinity of Findlay and Ottawa. Additional unrecorded nests may also be present.

Freshwater mussels

Twenty-nine mussel species were found in the Blanchard River and Eagle Creek during a 2009 survey of 8 areas in the vicinity of Findlay (Hoggarth and Burgess 2009). Unimpounded sections of the Blanchard River were found to support a locally significant mussel community, including several State endangered, threatened, and special concern species. All native freshwater mussels are protected by the State of Ohio.

Blanchard River, Aurand Run, Eagle Creek

The Blanchard River is a large perennial stream with a watershed of approximately 335 mi^2 at Findlay and 635 mi^2 at Ottawa. A very narrow forested riparian corridor is present along the length of much of the Blanchard River in the project areas. A 2005 water quality study (OEPA 2007) found generally depressed fish and macroinvertebrate assemblages in the Blanchard River upstream of Findlay due to nutrient impacts, organic enrichment from agricultural inputs, and poor sewage treatment. Downstream of Findlay, fish and macroinvertebrates assemblages had improved significantly following 2001 upgrades to the Findlay Wastewater Treatment Plant (OEPA 2007).

Eagle Creek is a Blanchard River tributary that flows into the Blanchard River in Findlay. The Eagle Creek watershed is approximately 61 mi^2. OEPA (2007) found depressed fish and macroinvertebrate assemblages there in 2005. The impairment to fish and macroinvertebrates was caused by flow alterations and nutrient inputs from crop production (OEPA 2007).

Aurand Run is a Blanchard River tributary that flows into the Blanchard River downstream of Findlay. The Aurand Run watershed is approximately 17 mi^2. A 2005 study of Aurand Run (OEPA 2007) revealed good fish communities that included pollution sensitive darter and sculpin species. The same study found good habitat quality and a good macroinvertebrate assemblage.

VI. Effects of Viable Alternatives on Fish and Wildlife and Recommendations for Minimizing Impacts

Aurand Run

A 2005 Ohio Environmental Protection Agency study of Aurand Run revealed good fish communities that included pollution sensitive darter and sculpin species (OEPA 2007). The same study found good habitat quality and a good macroinvertebrate assemblage. One proposed alignment for the Westward Diversion of Eagle Creek follows Aurand Run for a distance of approximately 1 mile. This would effectively convert portions of Aurand Run from a warmwater habitat stream to a flood control channel. It would drastically alter aquatic habitat in Aurand Run and result in severe impacts to aquatic biota. It may also be a violation of Ohio's water quality standards. We object to the use of Aurand Run as a Diversion Channel and recommend, if a Westward Diversion of Eagle Creek is included in the final plans, that the F1b alternative, which crosses but does not follow the alignment of Aurand Run, is selected.

Impacts of the Eagle Creek In-line Detention

The Service was told, during a September 11, 2013 coordination meeting with the Corps, that the Eagle Creek In-line Detention is no longer being considered as a viable alternative. However, because it is included as an alternative in the Interim Report, we will address it herein. Very few details were given in the Interim Report regarding the frequency, duration, or area of water impoundment caused by the In-line Detention. No information was provided regarding fish and wildlife resources within the footprint of the dam or in the area of impoundment. Aerial photography suggests that approximately 150 acres of forest lie within the area of potential impoundment, and the National Wetlands Inventory shows significant riverine and forested/scrub-shrub wetland resources in this forested area. We strongly recommend that the Eagle Creek In-line Detention be removed from consideration, due to the potential for significant impacts to upland forest and wetland forest habitat.

Indiana Bat and Northern Long-eared Bat

Several of the viable alternatives include, or may include, tree clearing in forested riparian areas adjacent to the Blanchard River and Eagle Creek. Examples include construction of in-line detention basins and diversion channels, and modification of the I-9 bridge. The Service was told, during a September 11, 2013 coordination meeting with the Corps, that riparian forest would not be impacted by the proposed Blanchard to Lye Diversion Cutoff, and that the Eagle Creek In-line Detention alternative had been removed from consideration. As discussed previously, we highly recommend that the Aurand Run Westward Diversion not be implemented. If neither the Eagle Creek In-line Detention or the Aurand Run Westward Diversion Route are implemented, and the Blanchard to Lye Diversion Cutoff does not include tree clearing in riparian forest, it appears that total tree clearing for any combination of the remaining array of alternatives would not exceed approximately 15 acres.

To minimize impacts to Indiana bats and northern long-eared bats, we recommend that final project plans be designed to keep tree clearing to a minimum, especially in riparian areas. Where tree clearing is unavoidable, trees should only be cleared from October 1 through March 31, when Indiana bats and northern long-eared bats would not be present. If total tree clearing will exceed our above estimate of 15 acres, we recommend that you coordinate with this office to determine if this seasonal tree clearing recommendation should be reconsidered.

Rayed Bean and Clubshell

A scoping survey of 6 sites on the Blanchard River in the vicinity of Findlay and 2 sites in Eagle Creek was conducted in 2009. Seven mussel species were found in Eagle Creek and 29 species were found in Blanchard River. No live or fresh dead rayed bean or clubshell were found, although weathered and subfossil shells of these two species were found downstream of Findlay in the Blanchard River. In 2013, ODNR, DOW and FWS released joint mussel survey protocols for Ohio (ODNR and FWS, 2013). The protocols identify streams where federally listed mussels are likely present. The Blanchard River in Hancock County is identified as a stream where federally listed mussels are expected. Although the 2009 scoping studies failed to find rayed bean and clubshell, those surveys were not necessarily conducted at areas specific to the proposed project impacts. In addition, mussels survey results in Ohio are valid for 5 years. The results of the 2009 surveys will expire prior to any construction activities occurring. Therefore, prior to construction of any alternatives that require in-water work, a mussel survey of the Blanchard River in Hancock County, at the specific project sites, should be conducted following the current Ohio Mussel Survey Protocols. Results of these surveys will facilitate ESA section 7 consultation for rayed bean and clubshell. Formal consultation may be required if rayed bean and or clubshell are found in project-specific surveys. Please refer to the Ohio Mussel Survey Protocols (ODNR and FWS 2013) for additional information.

Other native freshwater mussels

Native mussels are present in both Eagle Creek and the Blanchard River. Impacts to mussels from in-water work and flow diversions associated with the viable alternatives include direct crushing of animals, and impacts from sedimentation, substrate instability, altered hydraulics, and removal of riparian forest. The State of Ohio protects all native mussels and the Ohio Mussel Survey Protocols require surveys for projects that impact Eagle Creek and the Blanchard River (in both Hancock and Putnam Counties). We recommend that mussel surveys at the location of proposed projects, and any necessary relocations, occur prior to any work below the ordinary high water mark of Eagle Creek and the Blanchard River. Refer to the Ohio Mussel Survey Protocols (ODNR and FWS 2013) for details regarding survey methodology, timing, agency coordination requirements, and mussel relocations.

Migratory birds

Migratory birds are protected by the Migratory Bird Treaty Act. In the project areas, migratory birds nest primarily in forest and wetland habitats. Disturbance of these habitats impacts migratory birds through removal of active nests and reduction in the amount of available habitat. To minimize disturbance to migratory birds, we recommend that impacts to forest and wetlands is minimized to the maximum extent possible. Where impacts to these resources are unavoidable, they should not be disturbed from April 1 through September 30, to minimize impacts to nesting birds.

Blanchard River and Eagle Creek

High-flow diversions of Eagle Creek and the Blanchard River are among the viable array of alternatives. These alternatives would require significant stream bank modification and in-stream channel modifications to portions of Eagle Creek and/or the Blanchard River. The fish and macroinvertebrate communities in both the Blanchard River and Eagle Creek already suffer from habitat modifications caused by channelization, dams, flow modifications, and insufficient riparian corridor. We recommend that any high-flow diversions be designed to minimize instream and riparian impacts to the maximum extent possible. Any in-water work should be conducted during low flows to minimize sedimentation, and a storm water pollution prevention plan should be developed and followed. In addition, we recommend that in-water work not occur from March 1-June 15, to minimize impacts to fish spawning activities.

Bald Eagles

The Service has records of four bald eagle nests along the Blanchard River in the vicinity of Findlay and Ottawa. Additional unrecorded nests may also be present. We recommend that any project activities be kept a minimum of 200 meters from bald eagle nests. If projects are located within

200 meters of eagle nests, we recommend further coordination with the Service to determine appropriate avoidance and minimization measures. Additional information on avoiding impacts to bald eagles can be found here:
http://www.fws.gov/midwest/midwestbird/eaglepermits/index.html.

Habitat Restoration

Significant opportunities for habitat restoration appear to be available during implementation of at least two of the viable projects. Specifically, the Blanchard to Lye Diversion Cutoff includes acquisition of approximately 100 acres of floodplain forest and agricultural land and the Blanchard River Channel Realignment in Ottawa includes acquisition of an approximately 180-acre agricultural parcel in the floodplain of the Blanchard River. Considering much of Blanchard River watershed was historically within the Great Black Swamp, we recommend restoring these acquired parcels to native deciduous forest, and where site conditions allow, restore to forested wetland habitat. Floodplain and wetland forest are extremely valuable habitats for both terrestrial and aquatic biota. We recommend that the Corps consult "Guidelines for Wetland Mitigation Banking in Ohio" (Corps 2011) and follow the protocols therein for tree and shrub planting plans, performance standards, and monitoring protocols. We recommend a 10-year monitoring period for upland and wetland habitat restorations and protecting restored properties in perpetuity via conservation easement or environmental covenant.

We also recommend that the Corps explore additional opportunities to restore forested wetland and forested floodplain habitat. Examples of where restoration may be possible include in the vicinity of the proposed Off-Line Storage Areas adjacent to the Blanchard River between Findlay and Ottawa.

VII. List of Recommendations

1. Remove the following project alternatives from consideration:
    a. Westward Diversion of Eagle Creek via Aurand Run (F1-a)
    b. In-line Detention of Eagle Creek
2. Avoid tree clearing to the maximum extent possible. Where tree clearing is unavoidable, conduct tree clearing only from October 1 through March 31. Adhering to this seasonal restriction will minimize impacts to Indiana bats, northern long-eared bats, and migratory birds.
3. Avoid and/or minimize all stream and wetland fills.
4. Conduct mussel surveys and relocations following the most current version of the Ohio Mussel Survey Protocols.

5. Consult with the Service pursuant to section 7 of the Endangered Species Act of 1973, as amended.
6. Do not conduct in water work from March 1-June 15, to minimize impacts to fish spawning activities.
7. Conduct in water work only during low flows to minimize sedimentation. Develop and implement a storm water pollution prevention plan.
8. Keep all construction activities a minimum of 200 meters from any bald eagle nests.
9. Restore acquired parcels to upland and wetland forest.
10. Use "Guidelines for Wetland Mitigation Banking in Ohio" to develop habitat restoration planting plans, success criteria, and monitoring protocols. Develop and implement remedial actions if/when habitat restoration areas do not achieve success criteria.
11. Protect all habitat restoration areas in perpetuity through a conservation easement or environmental covenant.
12. Explore additional options for habitat restoration.
13. Coordinate with ODNR, DOW to avoid impacts to State-listed species.

VIII. Summary of Findings and FWS Position

The Service appreciates the opportunity to provide input regarding the Final Array of Plans for Flood Risk Management in Findlay and Ottawa, Ohio. The Service recommends that impacts to the Blanchard River, Eagle Creek, wetlands, and riparian forest be avoided and minimized to the maximum extent possible. We object to a westward diversion of Eagle Creek via Aurand Run and an in-line detention of Eagle Creek. We recommend conducting appropriate mussel surveys prior to project construction and consulting with the Service and ODNR on listed species impacts. We support maximizing floodplain habitat restoration.

IX. References

Hoggarth, M.A. and Burgess, L. 2009. Report on the mussels of the Blanchard River in the vicinity of Findlay, Ohio, 29 pp.

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OEPA. 2007. Biological and Water Quality Study of the Blanchard River and Selected Tributaries 2005. OEPA Technical Report EAS/2007-6-2, Columbus, Ohio.

X. Appendices

Ohio Department of Natural Resources

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April 16, 2014

Jeromy Applegate
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Rd., Suite 104
Columbus, OH 43230

Re: 14-114; Report Synopsis: Final Array of Plans - Blanchard River Watershed Interim Feasibility Study for Flood Risk Management in Findlay and Ottawa, Ohio

Project: The Blanchard River Watershed Study is being conducted to address the justification of providing flood damage risk reduction to the metropolitan areas of Findlay and Ottawa, Ohio as requested by Hancock County, the non-federal partner.

Location: The project focused on reducing flood risk within the City of Findlay and the Village of Ottawa, in Hancock and Putnam Counties.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The DOW recommends no in-water work in perennial streams from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat.

The proposed storage area 2, between Ottawa and Findlay, is located within Litzenberg Memorial Woods operated by the Hancock County Park District.

The proposed Aurand-Rua Alignment F1-a route passes through Oak Woods Nature Preserve operated by the Hancock County Park District.

The proposed Aurand-Rua Alignment F1-a route passes along a great blue heron rookery with a breeding animal concentration.

The ODNR Natural Heritage Database has mussel records within the Blanchard River at the proposed confluence of the Alternative 2 Alignment F2-b for the elktoe (*Alasmidonta marginata*), a state species of concern and a federal species of concern; the salamander Mussel (*Simpsonaias ambigua*), a state species of concern and a federal species of concern; and the deertoe (*Truncilla truncata*), a state species of concern. In addition, the project is within the range of the clubshell (*Pleurobema clava*), a state endangered species and a federally endangered species, the rayed bean (*Villosa fabalis*), a state endangered species and a federally endangered species, and the purple lilliput (*Toxolasma lividus*), a state endangered species. This project must not have an impact on freshwater native mussels in the area. This applies to both listed and non-listed species. The Ohio Mussel Survey Protocol requires a mussel survey for streams, and water bodies listed in Appendix A of the protocol. Therefore, the DOW recommends a mussel survey be conducted by a professional malacologist prior to any in-water construction activities occurring in the Blanchard River or Eagle Creek. Streams with a watershed of 100 square miles or larger above the impact point that are not listed in Appendix A of the protocol should also be assessed for mussels and/or mussel habitat. Mussel surveys may be recommended for these streams as well. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol.

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis),* Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (*Populus deltoides*), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consists of suitable trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees should be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between October 1 and March 31. If suitable trees must be cut during the summer months, a net survey must be conducted between June 15 and July 31, prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The ODNR Natural Heritage Database has no other records for rare or endangered species at this project site. We are unaware of any other unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges or other protected natural areas within the project area. Our inventory program does not provide a complete survey of Ohio wildlife, and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area.

Natural Areas: The Division of Natural Areas and Preserves has the following comments.

After reviewing the files of the Natural Heritage Database, Rock Elm, *Ulmus thomasii*, listed as potentially threatened by the ODNR Division of Natural Areas and Preserves, has been

documented in the project area at Oak Woods Nature Preserve. If alternative F1a is implemented, we suggest that the riparian habitat that supports rock elm be left intact. Additional riparian areas of the Blanchard River and adjacent tributaries may also contain *Ulmus thomasii*. We recommend surveying for this species before any clearing of forested habitat occurs. Please contact Tom Arbour of the division at 614-265-6575 or tom.arbour@dnr.state.oh.us for additional assistance or if surveys reveal *Ulmus thomasi*.

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

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2.2 Federal- and State-listed Species Table

Federally- and state-listed Species within Hancock County			
Federally-listed Species			
Species	**Federal Status**	**Habitat[1]**	**Occurrence within the Project Area**
Bald Eagle (*Haliaeetus leucocephalus*)	Recovery	Various forests types and forested wetlands with nearby lakes and rivers	High Potential based on available data concerning nesting pairs[2]
Rayed Bean (*Villosa fabalis*)	Endangered	Shoals or riffles in creeks and medium-sized rivers, sometimes in large rivers	Low potential based on absence of live or recent dead specimens found during 2009 survey in the Blanchard River[3]
Clubshell (*Pleurobema clava*)	Endangered	Sand and fine gravel within riffles and runs of creeks and rivers	Low potential based on absence of live or recent dead specimens found during 2009 survey in the Blanchard River[3]
Indiana Bat (*Myotis sodalis*)	Endangered	Various forest types especially in those surrounded by agricultural land.	High potential given the known range, mobility and habitat preferences of this species
Northern Long-eared Bat (*Myotis septentrionalis*)	Proposed Endangered	Intact interior forests with trees 100 years old or older preferred	Low potential given this species habitat preferences and the lack of preferred habitat within the project area
State-listed Species[4]			
Species	**Federal Status**	**Habitat[1]**	**Occurrence within the Project Area**
Prairie Thimbleweed (*Anemone cylindrica*)	Threatened	Dry open wooded areas, slopes and prairies	Moderate potential based on habitat preference availability in the project area
Southern Hairy Rock Cress (*Arabis pycnocarpa var. adpressipilis*)	Potentially Threatened	Forests with rock outcrops, cliffs and sandy areas	Low potential based on habitat preference availability in the project area
Northern Fox Sedge (*Carex alopecoidea*)	Endangered	Riparian wetlands, wetland meadows	Moderate potential based on
Five-angled Dodder (*Cuscuta pentagona*)	Threatened	Prairies, fallow fields, coastal plain marshes and sandstone ledges[5]	Moderate potential based on habitat preference availability in the project area
Rock Elm (*Ulmus thomasii*)	Potentially Threatened	Loamy soils and dry upland areas	Moderate potential based on habitat preference availability in the project area
Eastern Cricket Frog (*Acris crepitans*)	Special Concern	Marshes, marshy ponds, and slow-moving streams in open areas	Moderate potential based on habitat preference availability in the project area
Elktoe (*Alasmidonta marginata*)	Special Concern	Cobble, gravel and sand substrates within small to large streams	High potential based on available Ohio Natural Heritage information and prior surveys in the project area
Kirtland's Snake (*Clonophis*	Threatened	Open and wooded	Moderate potential based on habitat

kirtlandii)		wetland areas; near ponds and creeks	preference availability in the project area
Western Banded Killifish (*Fundulus diaphanus menona*)	Endangered	Detritus, sand or gravel substrates in lakes, ponds, slow-moving streams	Moderate potential based on habitat preference availability in the project area
Plains Clubtail (*Gomphus externus*)	Endangered	Sand or mud substrates within streams and rivers	Moderate potential based on habitat preference availability in the project area
Four-toed Salamander (*Hemidactylium scutatum*)	Special Concern	Swamps, boggy streams, open or woody wet areas; often associated with sphagnum moss	Low potential based on habitat preference availability in the project area
Creek Heelsplitter (*Lasmigona compressa*)	Special Concern	Gravel, sand or muddy substrates in various sized streams and rivers	High potential based on habitat preference availability and prior surveys in the project area
Black Sandshell (*Ligumia recta*)	Threatened	Coarse sand and gravels/cobbles in medium to large rivers with strong current	Moderate potential based on habitat preference availability and prior surveys in the project area
Northern Crayfish (*Orconectes virilis*)	Special Concern	Low gradient creeks and rivers withy rock, log and organic debris cover	Moderate potential based on habitat preference availability in the project area
Clubshell (*Pleurobema clava*)	Endangered	Sand and fine gravel within riffles and runs of creeks and rivers	Low potential based on absence of live or recent dead specimens found during 2009 survey in the Blanchard River[3]
Round Pigtoe (*Pleurobema sintoxia*)	Special Concern	Sand, gravel and muddy substrates in medium to large rivers	Moderate potential based on habitat preference availability in the project area
Prothonotary Warbler (*Protonotaria citrea*)	Special Concern	Floodplains, riversides and swamp forests with scattered snags and shrubby areas	High potential based on habitat preference availability in the project area
Kidneyshell (*Ptychobranchus fasciolaris*)	Special Concern	Riffles within coarse sand and gravel in small to medium-sized rivers, although can occur in large rivers	High potential based on habitat preference availability and prior surveys in the project area
Virginia Rail (*Rallus limicola*)	Special Concern	Shallow areas of emergent, freshwater wetlands; occasionally in brackish water	Moderate potential based on habitat preference availability in the project area
Salamander Mussel (*Simpsonaias ambigua*)	Special Concern	Sand or silt with flat rocks for cover in riffles of rivers ranging from medium to large in size	High potential based on available Ohio Natural Heritage information and prior surveys in the project area
Purple Lilliput (*Toxolasma lividus*)	Endangered	All substrate types in riffles or flats above riffles of waters ranging from headwater streams to medium-sized rivers	Low potential based on habitat preference availability and prior surveys in the project area
Deertoe	Special Concern	All substrate types and	High potential based on available

(*Truncilla truncata*)		river sizes, although most often associated with medium-sized rivers	Ohio Natural Heritage information and prior surveys in the project area
Rayed Bean (*Villosa fabalis*)	Endangered	Shoals or riffles in creeks and medium-sized rivers, sometimes in large rivers	Low potential based on absence of live or recent dead specimens found during 2009 survey in the Blanchard River[3]

[1] Life history information gathered from NatureServe (at http://explorer.natureserve.org), unless otherwise noted

[2] Geospatial data concerning bald eagle nests within the project area provided by the USFWS on 13 August, 2014

[3] Hoggarth, M.A., and L. Burgess. 2009. Report of the mussels of the Blanchard River in the vicinity of Findlay, Ohio. Prepared for the Northwest Ohio Flood Mitigation Partnership, Inc. 23 October 2009.

[4] Listed-species information gathered from ODNR 2014 (at http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/species%20and%20habitats/state-listed%20species/hancock.pdf)

[5] Life history information gathered from Wisconsin Department of Natural Resources (at http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDCUS01140)

2.3 Indiana Bat Habitat Survey Report

Indiana Bat Habitat Assessment

Blanchard River Flood Protection Project
City of Findlay – Village of Ottawa
Ohio

December 2010

Submitted to

Northwest Ohio Flood Mitigation Partnership
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Introduction

Northwest Ohio Flood Mitigation Partnership, Inc (Partnership) is a private/non-profit organization whose purpose is to expedite the design and development of a flood mitigation plan to be implemented in coordination with responsible public authorities in the Blanchard River Watershed. In April of 2008, the City of Findlay and the Village of Ottawa signed Feasibility Cost Share Agreements with the United States Army Corps of Engineers (CoE) to develop a flood damage reduction project for the Blanchard River Watershed. The study area for this project is approximately 3,500-acres as illustrated on the map in Appendix A of this report.

Prior coordination with the CoE and the United States Fish and Wildlife Service (USFWS) indicates that habitat surveys are required to determine the potential impact to the state and federally endangered Indiana Bat (*Myotis sodalis*) and to help determine the extent (if any) of a mist-netting survey should one be deemed necessary.

This document includes a report for a habitat assessment for the state and federally endangered Indiana Bat. This report is based on literature reviews, interviews with local scientists, and local land owners, and several days of field reconnaissance.

Indiana Bat (Myotis Sodalis) – Natural History Summary

Species Morphology

Indiana Bats are similar in appearance to other *Myotis* species. It is most often distinguished from other *Myotis* by the presence of a keeled calcar and short hairs on the toes (Schwartz and Schwartz 1981). The pelage of Indiana bats ranges in color from light brown to nearly black. The tragus is blunt, and measures less than half of the total length of the ear. Average weight of an adult Indiana bat is 7-8 grams.

Species Status

The U.S. Fish and Wildlife Service listed the Indiana bat as endangered on March 11, 1967. The Indiana bat population (as recorded from counts in hibernacula) has declined dramatically since the late 1950's throughout its range. A principle cause of decline is thought to be destruction of hibernacula from collapse, flooding, and vandalism by humans. Other major reasons for decline of Indiana bat populations include summer habitat loss and pesticide poisoning (UFWS 1999). Recently, a new threat has been identified; white nose syndrome (wns) is a fungal disease linked to massive die-offs of many species of hibernating bats, including the Indiana Bat. It is presently unknown if the fungus is the cause of death or a symptom of more complex disease.

Based on recent censuses taken at hibernacula, the total known population of Indiana bats is estimated at 380,000. (http://www.fws.gov/midwest/reynoldsburg/endangered/indiana_bat.html). Half of all hibernating Indiana bats in existence currently winter in Indiana (UFWS 1999).

Distribution and Range

The known range of the federally endangered Indiana Bat *(Myotis sodalis)* covers all of Ohio. It can be found in any area where suitable summer or winter habitat exists. Other species of bats that could potentially inhabit the project area include: Little Brown Bat (*Myotis lucifugus*), Northern Bat (*Myotis septentrionalis*), Tri-colored Bat (*Perimyotis subflavus)*, Evening Bat (*Nycticeius humeralis*), Silver-haired Bat (La*sionycteris noctivagans*), Red Bat (*Lasiurus borealis*), Hoary Bat (*Lasiurus cinereus*), as well as the State listed Small-footed Bat (*Myotis leibii*) and Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*).

Hibernation Requirements

The Indiana bat hibernates in caves or abandoned mines. Termed "hibernacula" the Indiana bat has very specific, and narrow, environmental requirements for successful hibernation. Indiana bats hibernate from mid-November to mid-April in caves or mines with stable temperatures below 10°C, preferably from 4° to 8°C (UFWS 1983). Hibernating Indiana bats may form large clusters on hibernacula ceilings. Disturbance during hibernation may lead to the death of hibernating bats. Once aroused, their metabolic rates increase and they may not have sufficient fat reserves to continue through the winter.

Prior to entering hibernation, Indiana bats swarm for several months outside and near the hibernaculum. Autumn swarming is a behavior in which large numbers of bats fly in and out of cave entrances from dusk to dawn while relatively few roost in the caves during the day. Animals engaged in this behavior have arrived from summer habitat and subsequently will roost in caves to hibernate through winter. Males arrive first at hibernacula in August. During this period, males and females engage in courtship and mating. The females store sperm through winter hibernation and become fertilized in the spring.

Summer Habitat

Following hibernation, female Indiana Bats disperse (March-May) and can potentially be found throughout Ohio. After emerging from winter hibernation, females migrate to summer maternity roosts to rear their young. Indiana bat is highly specific concerning maternity roost selection. Maternity roosts are almost exclusively trees with characteristics that include exfoliating bark or open cavities larger than a fist. *Carya ovata* (shagbark hickory) is commonly cited as the classic maternity roost tree for this species. Furthermore, maternity roosts usually need to be positioned so as to receive sufficient amounts of direct sunlight to provide thermal conditions necessary for the rapid development of young (Humphrey, et al., 1977) (Kurta, et al., 1993). Trees at the edges of streams or in beaver ponds, standing alone in fields or fence-rows, or in forest clearings are usually chosen, as they tend to receive more sunlight than a tree in the middle of a dense woods or forest.

The Habitat Suitability Index (HIS) (Romme et al. 1995) lists 5 important variables to consider when evaluating the quality of summer maternity habitat and the likelihood of encountering reproducing colonies of Indiana Bat within a larger project area. Variables to consider include:

1. Amount of overstory canopy (60%-80% optimal)
2. Diameter of overstory trees with dbh of 15.7 inches optimal
3. Density of suitable roost trees (16/acre optimal)
4. Amount of understory cover (35% or less optimal)
5. Diversity of foraging habitats (fields, farms, wetlands, lakes, ponds, and riparian areas)

There is evidence that many bats return to the same watershed each year (Humphrey, et al., 1977). The inadvertent destruction of all suitable roosting trees within a watershed or large geographical area can play a major role in the decline of this species. If a pregnant female migrant returns to a traditional roost watershed to find no suitable roosting trees, she faces additional energy drains in searching for a suitable site at a time when she is already stressed from hibernation, migration, and the energy demands of pregnancy. These additional stresses may be sufficient to cause her own mortality or that of her offspring.

Indiana Bat forages over wooded areas and riparian and floodplain forests near small to medium sized streams (Humphrey, et al., 1977). Riparian corridor use may be more a function of availability than preference, since clearing has left fewer habitats in upland areas.

Deforestation has been cited as a cause of decline for this species. Tree cutting during the summer brooding season is especially destructive and can impact entire colonies. Currently, the U.S. Fish and Wildlife Service (USFWS) restricts the cutting of potential maternity roost trees between April 1 and September 30. The removal of trees outside of this time period can be conducted with minimal impact to the species. If circumstances necessitate the cutting of trees within this restricted period, a mist-netting survey is required to document the status of this species within the area of concern.

Conservation Priorities

A recovery plan for Indiana bats was developed by a FWS-sponsored Recovery Team (UFWS 1983). The objectives of the plan are to: (1) protect winter hibernacula, (2) maintain, protect, and restore summer maternity habitat, (3) monitor population trends (4) educate (5) continue research. Revision of the 1983 draft recovery plan is in progress.

Habitat Survey Methodology

During the summer, Indiana Bat are reliant on forested habitats. Trees provide refuge and serve as maternity roosts and day roosts. In addition, forested riparian areas provide shelter for Indiana Bat to drink and forage for insects. Indiana Bat are selective regarding the types of trees that are suitable for maternity colonization. Exfoliating bark of mature, live and dead/dying trees of various species is favored for use as maternity roosts. Additionally, maternity colonies tend to utilize more than one tree and more than one location on individual trees. The number of alternative roosts for individual colonies varies but larger tracks of forest generally provide more opportunities for roosting bats. Roost tree utilization is also dependant on a variety of other factors including proximity to water, density of forest understory, vines covering roost trees, and solar exposure.

The Habitat Suitability Index (HSI) Model (Romme et al., 1995) for Indiana bats provides an index of the suitability of habitat for large land areas. The five most important variables for roosting habitat include:

1. Amount of overstory canopy (60-80% optimal)
2. Diameter of overstory trees (average dbh of 15.7 inches - optimal)
3. Density of potential live high quality roost trees (at least 16 per acre - optimal)
4. Density of potential snag roost trees (at least 6 per acre with a dbh of at least 8.7 inches – optimal)

5. Amount of understory cover (35% or less – optimal).

For the purpose of this project, habitat for the Indiana Bat was assessed in the following manner:

1. A map of the site was produced that illustrating all forested areas, including acreage.
2. The area was extensively walked by Tragus staff to qualitatively assess habitat.
3. A description of forested habitat, including dominant species, composition, age, density of understory, and canopy cover was completed for all forested areas.
4. A map illustrating the quality of forested habitats was produced. Forested resources were visually surveyed and evaluated based on the following criteria:

    a. Excellent Habitat – (areas with at least four of the habitat qualities listed below)
        i. Amount of overstory canopy between 60%-80%.
        ii. Areas with 16 or more suitable live roost trees/acre and/or 6 or more snag roost trees/acre.
        iii. Average diameter of overstory trees 16 inches or more.
        iv. Amount of understory canopy 35% or less.

    b. Moderate Habitat – (areas with 2-3 of the habitat qualities listed below)
        i. Amount of overstory canopy between 60%-80%.
        ii. Areas with 16 or more suitable live roost trees/acre and/or 6 or more snag roost trees/acre.
        iii. Average diameter of overstory trees 16 inches or more.
        iv. Amount of understory canopy 35% or less.

    c. Low Quality Habitat – (areas with one or none of the habitat qualities listed below)
        i. Amount of overstory canopy between 60%-80%.
        ii. Areas with 16 or more suitable live roost trees/acre and/or 6 or more snag roost trees/acre.
        iii. Average diameter of overstory trees 16 inches or more.
        iv. Amount of understory canopy 35% or less.

5. In addition to the habitat quality assessment described above, the final map products and analysis included other items as described below:
    a. Location and size of any other forested properties within the vicinity of the project that are protected in perpetuity (ex: parks, conservation easements, etc.)
    b. Location of foraging habitats and travel corridors.
    c. Description of connectivity of the site and other adjacent forested parcels.
    d. Description of other natural features important to bat ecology and natural history
    e. Recommendations for potential mist-net survey areas that are most likely to be used by Indiana Bat.

Habitat Survey - Results

Database Review

The United States Fish and Wildlife Service tracks the known locations and sample sites for Indiana bats. A recent monitoring map for the vicinity of the project area is included as part of Appendix B.

The map indicates three historical locations for Indiana bat from the vicinity of the project area. Two recent locations were documented in Hardin County and an older record from nearby Paulding County. Appendix B includes several closer aerial captions from the approximate location of these finds. Examination of these images indicates similar overall habitat from that found within the project limits of this study. The overall landscapes are agrarian with narrow forested riparian areas and small fragmented woodlots.

Angela Boyer of the USFWS provided additional information regarding the more recent records (personal communication). Indiana Bat encountered in nearby areas were occupying a variety of habitats and roost trees with characteristics, and in similar landscapes, to what is documented for this study.

Caves and Geology

The entire project area falls within Ohio's karst region. This type of underlying geology is conducive to the formation of caves and caverns which can serve as winter hibernacula for Indiana bat as well as many other common bat species. The Ohio Department of Natural Resources, Division of Wildlife was contacted for records from their Natural Heritage Database. In particular, a request was made regarding the known locations of caves or caverns from the project limits. Their report is included as part of Appendix C and indicates no such features are known from their database. However, an internet search indicates that there are several commercial caves from the general vicinity. Indian Trail Caverns is the closest known cave and is approximately 12 miles southeast of Findlay (http://www.indiantrailcaverns.com). Little published data is available regarding the current use of Indian Trail Caverns by bats. However, historical records exist regarding the use of this cave by myotis species as part of the fossil record (Holman, 1931).

Zane's Caverns and Ohio Caverns are located approximately 50-60 miles south of the project area. Ohio caverns is operated as a tourist and educational facility.

As part of an unrelated project, Tragus biologists visited Ohio Caverns in 2008 and spoke with staff naturalists regarding any known use of the area by bats. Staff at the site indicated that both Little Brown Bat and Tri-colored Bat are known to hibernate in the caves but no formal studies have been conducted to document the numbers or full diversity of species that might utilize the site.

Zane's Caverns is owned the Shawnee Nation United Remnant Band and the facility is operated as a tourist attraction and educational facility. As part of a separate study, Tragus staff conducted telephone interviews with the owners of Zane's Caverns. During telephone interviews, representatives of Zane's Caverns repeatedly declined to share any information about the biology of their caves and indicated they would not be willing to allow any surveys to take place. Although specific information could not be obtained by staff at Zane's caverns, a simple internet

search did result in marginally significant information. On December 18, 1997, the Pinckney Grotto visited the caverns with representatives of the Shawnee Nation United Remnant Band. The results of their tour and investigation were posted on their website (http://members.aol.com/cdrodeffer/pag/1997december18.html). Although it is clear that the cavers did see hibernating bats during their visit, it is not clear that they could accurately discern what species they encountered. Their report speaks of "big red bat" "little brown or Indiana bat", and "gray bat" but it is apparent that the investigators have limited, if any, experience at identification of hibernating bats. Although it is not possible to determine specific species, it is certain that at least a small number of bats utilize Zane's Caverns as a hibernation site.

Sheridan Cave and Indian Trail Caverns are closest to the project area. Tragus biologists visited the site on November 11, 2010 but the area was closed. A subsequent telephone interview with owners of the facility indicated that a small number of bats are known to hibernate in the caverns although species specific information was not available. The owners directed Tragus biologists to Dr. Horton Hobbs of Whittenberg University who had visited the caves the previous year as part of a state-wide cave survey. Dr. Hobbs was contacted via e-mail and indicated that Sheridan cave did not support the necessary environment for Indiana Bat hibernacula. No formal bat surveys were conducted by Dr. Hobbs but his evaluation of the site is likely sufficient to rule out the possibility that Indiana Bat are utilizing the Sheridan Caverns system as hibernacula.

Summer Habitat Evaluation

Forested habitats were evaluated in both fall and early winter conditions as previously described. In some instances, forested areas were not well defined and existed as mosaics of forest, field, and shrub thickets. In the later cases, the boundaries of the mosaics were delineated and the percent forest cover for the area was visually estimated.

Field Dates for this project include

August 16, 2010
August 17, 2010
October 2, 2010
October 3, 2010
October 4, 2010
November 19, 2010
November 20, 2010
November 21, 2010

Covermapping for the project area is presented in Appendix A. Representative photographs are presented in Appendix D and E.

The area includes approximately 3,500 acres and is a mix of natural areas, agricultural, residential, commercial and light industrial.

A summary of the summer habitat survey results is presented in Table 1. Overall, habitat is limited to narrow riparian corridors with smaller isolated woodlots existing on slightly higher ground away from stream corridors. Overall forest diversity is extremely low throughout the study area. The dominant forest community is a cottonwood/silver maple floodplain

complex. The quality and extent to the habitat is best in areas that are away from urban zones. Although there is little habitat within the more urban portions of the study limits, even these areas still support a narrow forested riparian zone with sufficient forested resources for inclusion as "poor habitat".

Table 1. Summary of Indiana Bat Habitat Data	High Quality Habitat (KM2)	Moderate Quality Habitat (KM2)	Poor Quality Habitat (KM2)	Forest Habitat Totals (KM2)	Blanchard River (KM)	Tributaries (KM)	Stream Habitat Totals (KM)
Ottawa Area	0.94	0.62	0.09	1.65	12.18	1.36	13.54
Findlay Area	0.45	0.92	0.46	1.83	9.05	11.44	20.49

Tree species noted for the study area are listed in Table 2.

Table 2. Tree and Shrub Species Noted for Study Area

Commonly Encountered Species

Scientific Name	Common Name	Scientific Name	Common Name
Ulmus americana	American elm	*Platanus occidentalis*	sycamore
Lonicera sp	honeysuckle	*Fraxinus sp*	ash
Quercus rubra	red oak	*Fraxinus pennsylvanica*	green ash
Elaeagnus umbellata	autumn-olive	*Acer negundo*	box elder
Populus deltoides	eastern cottonwood	*Acer rubrum*	red maple
Rhamnus cathartica	European buckthorn	*Asimina triloba*	pawpaw
Gleditsia triacanthos	honey locust	*Cornus sericea*	red-osier dogwood
Acer saccharinum	silver maple	*Carya ovata*	shagbark hickory

Noted Species but Less Commonly Encountered

Scientific Name	Common Name	Scientific Name	Common Name
Acer platanoides	Norway maple	*Maclura pomifera*	osage-orange
Acer saccharum	sugar maple	*Populus grandidentata*	big-tooth aspen
Ailanthus altissima	tree-of-heaven	*Prunus serotina*	black cherry
Catalpa speciosa	northern catalpa	*Quercus alba*	white oak
Cornus amomum	silky dogwood	*Quercus imbricaria*	shingle oak
Cornus florida	flowering dogwood	*Quercus macrocarpa*	bur oak
Cornus racemosa	gray dogwood	*Quercus palustris*	pin oak
Crataegus sp	unknown hawthorn	*Rhus typhina*	staghorn sumac
Juglans nigra	black walnut	*Rosa multiflora*	multiflora rose
Ligustrum vulgare	common privet	*Rubus allegheniensis*	common blackberry
Lindera benzoin	spicebush	*Viburnum dentatum*	arrow-wood

While there are many trees and forested areas with suitable habitat characteristics for maternity colonization by Indiana Bat, overall forest biodiversity is extremely limited. The majority of the forested areas are dominated by silver maple/cottonwood floodplain forest.

In addition to forested riparian areas, the study area offers a variety of other habitats that could be used as foraging areas by Indiana Bats. The overall region is a mix of forest, agricultural fields,

upland old fields, successional habitats with additional areas occupied by wetlands and farm ponds. The existing natural areas and diversity of habitats offer excellent foraging, as well as roosting, habitat for Indiana Bat. Overall subjective evaluation of potential Indiana Bat habitat on the subject property is good to excellent.

A description of habitats is provided below. For convenience in reporting, habitat areas are organized and described according to map products illustrated in Appendix A. Representative photographs are presented in Appendix D and E and are also organized into general areas according to map layouts presented in Appendix A of this document.

Habitat Survey Results Ottawa Area

Map Area A
This area supports some of the most diverse and highest quality areas within the Ottawa Area study limits. Forest community is a cottonwood/silver maple complex but other noted trees include box elder maple, honey locust, American elm, Norway maple, sycamore, and ash. There are ample trees from a variety of age classes that could serve as potential maternity roost trees. The overstory canopy varies between 60%-80% (average), and the understory is generally clear in most areas. There are ample areas that are excellent candidates for mist-netting for bats. Within this section of the Blanchard River, there are long stretches of water with nearly 100% canopy closure. Even in the more open areas, there are overarching trees and bridge crossings that can serve as possible netting sites. In addition to the Blanchard River, there are a few access roads and small tributaries that might serve as suitable netting locations.

Map Area B
Portions to the NW and SE of this map view support high quality habitat areas similar to those described for Map Area A. The center of this map view is characterized by moderate and poor quality habitat areas. The lowest quality areas are located in the center of the Village of Ottawa that has experienced the most disturbance. Although habitat is present along the entire stretch of the Blanchard River, the amount of habitat is limited and the number of suitable roost trees are fewer, generally accounting for the lower scores. The forest community in the low and poor quality habitat areas is dominated almost entirely by silver maple and cottonwood. The higher quality areas at the SE section of Map B include low ridges that support a more diverse forest community including an abundance of red and burr oaks and shagbark hickory. The Blanchard River in this area tends to be more open and presents a more challenging setting for netting bats. Although the more open canopy is not ideal, there are still locations with overarching trees and bridges that are suitable for netting. Any mist-netting efforts planned for these more open areas should be coordinated to coincide with the new moon and/or significant cloud cover to block ambient light and improve catch rates.

Map Area C
This area includes both moderate and high quality habitats. The majority of the mainstem of the Blanchard River supports moderate quality habitats largely due to a lower number of suitable roost trees. The far eastern portion of the Blanchard River and Riley Creek support excellent quality habitat largely due to a greater number of trees that could potentially

support maternity colonies. The forest communities in this area are slightly more diverse than other portions of the study area. Although silver maple and cottonwood are still the dominate tree species, this area includes a significant component of oaks (red, white and burr), shagbark hickories, American elm, and a few sycamores. The mainstem of the Blanchard in this stretch is largely open and presents challenges for the capture of bats. Netting in this area should focus on small areas where individual trees arch over the fly-way. In addition Riley Creek supports a good flight corridor and should be included in any future netting efforts. A few small access paths run parallel to the Blanchard River and may act as secondary netting corridors should work over the Blanchard prove unproductive.

Habitat Survey Results Findlay Area

Map Area A
This area supports some of the most diverse and highest quality areas within the Findlay Area study limits. The section of forest at the far western end of the study area is protected by the Hancock County Park District and is a designated sportsman river access area. Forest community is a cottonwood/silver maple complex but other noted trees include box elder maple, honey locust, American elm, sycamore, ash, red maple, box elder maple, red oak, white oak, burr oak, and catalpa. There are ample trees from a variety of age classes that could serve as potential maternity roost trees. The overstory canopy varies between 60%-80% (average), and the understory is generally clear in most areas. There are ample areas that are excellent candidates for mist-netting for bats. Within this section of the Blanchard River, there are long stretches of water with nearly 100% canopy closure.

Portions of the Blanchard in the central portion of Map Area A are less diverse and tend to me more open. Tree species are largely dominated by silver maple and cottonwood and the area lacks the greater diversity of the area immediately to the west. Several small woodlots are mapped within a finger of study area that juts to the south. These areas have been recently cleared for development that do not yet appear on the most recent aerial photographs.

Map Area B
This area supports areas of poor to moderate habitat quality for Indiana Bat. In general, the riparian forests are smaller, especially in the more central urban areas. There are fewer suitable roost trees and in many areas, there is virtually no canopy cover over the Blanchard River. The forested riparian community is dominated by silver maple and cottonwood with lesser amounts of elm, ash, and red maple. Although the Blanchard is fairly open in this area, a few areas have overarching tree canopy that would be suitable for netting and there are several large bridges that could serve as possible netting sites. A bike trail runs parallel to the north side of the Blanchard and could be utilized as a secondary netting corridor should the Blanchard River prove difficult to sample. A small tributary enters the Blanchard just east of the I-75 crossing. Howard Run is a smaller stream with an early to late successional riparian forest. Although there are few trees within this area that are suitable as roost sites, the Howard Run corridor represents a good opportunity to capture bats that may be roosting nearby.

The downtown area is the most impacted and offers the least amount of roosting habitat. However, even in this area, there are several large cottonwood trees with ample habitat characteristics that would qualify them as potential roost trees. Netting in this area will be difficult and will likely be limited to bridge underpasses and possibly along a small river walk trail.

Map Area C (Blanchard River Area)
Habitat along the Blanchard River in Map Area C represents some of the poorest quality habitat within the study area. There are few suitable roost trees. Although a narrow forested community flanks most of either side of the river, the area is extremely narrow in most places and dominated by successional silver maples and cottonwood trees. There is virtually no canopy closure over the Blanchard River. The only suitable netting areas are under bridge overpasses.

Map Area C – D (Eagle Creek Corridor)
Eagle Creek is a direct tributary to the Blanchard River and supports a variety of habitats for Indiana bat. The best quality habitats are found in the upper headwaters as shown on Map D in Appendix E. Forest community is a cottonwood/silver maple complex but other noted trees include box elder maple, honey locust, American elm, sycamore, ash, red maple, and box elder maple. There are ample trees from a variety of age classes that could serve as potential maternity roost trees. The overstory canopy varies between 60%-80% (average), and the understory is generally clear in most areas. There are ample areas that are excellent candidates for mist-netting for bats. Within this section of the Blanchard River, there are long stretches of water with nearly 100% canopy closure.

A large private residence just east of the headwaters of Eagle Creek supports a diversity of wetlands habitats and provides excellent foraging areas for Indiana bat. In addition, there are several isolated woodlots near the Eagle Creek corridor. These areas tend to be drier than the riparian woodlands and include significant numbers of oaks and hickories.

The central portion of the Eagle Creek corridor has a fewer number of suitable roost trees and represents moderate quality habitat. The most downstream portions of the Eagle Creek corridor are more impacted, includes few suitable roost sites, and is characterized by a more open canopy. The understory in this area is also heavily impacted by invasive honeysuckle.

Map Area C – D (Lye Creek Corridor)
Lye Creek is a direct tributary to the Blanchard River and supports a variety of habitats for Indiana bat and is very similar to habitat quality found within the Eagle Creek corridor. The best quality habitats are found in the upper headwaters as shown on Map D in Appendix E. Forest community is a cottonwood/silver maple complex but other noted trees include box elder maple, honey locust, American elm, sycamore, ash, red maple, and box elder maple. There are ample trees from a variety of age classes that could serve as potential maternity roost trees. The overstory canopy varies between 60%-80% (average), and the understory is generally clear in most areas. There are ample areas that are excellent candidates for mist-netting for bats. Wooded portions of the riparian corridor tend to be characterized by enclosed canopy and bridge crossings offer limited netting opportunities in more open areas.

Several isolated woodlots are found near the Lye Creek corridor and are dominated by oaks and hickories. These woodlots stand in contrast to the cottonwood/silver maple floodplains found throughout most of the rest of the project area and appear to be managed for timber production and hunting areas.

Habitat Survey Results – Surrounding Landscapes and Protected Areas

A map showing the general locations of protected areas within, and adjacent to, the project area is presented in Appendix F of this document. In many cases, it was not possible to obtain shapefiles for protected areas or specific boundary maps. Some areas were digitized by estimations made from examination of aerial maps. In some instances, the approximate location of a protected resource is simply symbolized by a place marker with no estimation of size.

The nearest state park is Van Buren State Park but this area is located a great distance to the north of the project area. The Hancock County Park District is the most prominent conservation organization within the confines of the study limits. Adjacent Putnam County does not support a local park district. The mission of the Hancock County Park District is below.

> Mission Statement of the Hancock Park District is to create, preserve, protect, restore and manage a system of parks, nature preserves, and outdoor recreational facilities to be held in public ownership with a focus on local, natural, historical, and cultural resources and maintained for the leisure use, education and enjoyment of this and future generations.

The Hancock County Park District provided mapping information for a number of their land holdings. The most prominent areas they own/manage include Blanchard and Liberty Landings, Blanchard River Greenway, Blue Rock Nature Preserve, Litzenbert Memorial Woods, LMW Heritage Trail Center, Oakwoods Nature Preserve, River Landings, Riverbend Recreation Area, and Riverside Park Waterfront.

The map in Appendix F includes an aerial view of both the Findlay and Ottawa areas and the surrounding landscape. Habitat within the confines of the study area appears to be similar to the surrounding landscape and exists as a mix of agricultural areas with some residential and light industrial. The majority of the natural areas are wetlands and riparian corridors that are not suitable for development or agriculture.

Throughout the greater area, the Blanchard River corridor is the only element of connectivity between natural areas. Between The City of Findlay and The Village of Ottawa, the Blanchard supports a narrow to modest forested riparian zone that connects these two areas and other surrounding sparse habitats.

Summary and Discussion

A habitat survey was performed for a 3,500-acre project area for the Blanchard River Flood Protection Project. Overall habitat varies but includes significant areas of excellent and moderately good habitat. In many areas, the Blanchard River and associated tributaries offer all the habitat requirements for Indiana Bat. Significant forested areas flank much of the riparian

areas and there are adequate numbers of roost trees suitable for maternity colonization by Indiana bat. Most of the riparian areas are dominated by silver maple/cottonwood floodplain forest. Of particular note is the widespread presence of cottonwood trees. Fast growing and short lived, the cottonwood provides an abundance of habitat for roosting bats, even in the more urbanized core areas. Although less common, slight ridges and isolated woodlots support a vastly different forest community. These slightly elevated areas are dominated by oaks and hickories and increase habitat diversity for roosting bats that may seek an alternate roost environment appropriate for changing weather patterns. Long stretches of the Blanchard support a nearly enclosed tree canopy and serve as excellent flight corridors for foraging, drinking, and can serve as transportation corridors. In addition, there are several access roads and utility corridors present in the study area that can also serve as foraging and transportation routes. Although the surrounding landscape is largely devoted to agriculture, the overall area is similar in composition to areas where significant populations of Indian Bat have been recently discovered.

Based on the results of this habitat analysis and the presence of several nearby records, the likelihood of Indiana Bat inhabiting the project area is moderately good. Mist-netting surveys are recommended to fully determine the potential use of this study area by Indiana bat.

Summer Mist-Netting Surveys

Based on the results of the habitat survey, a mist-netting survey is recommended to fully assess the possible presence and use of the study area by Indiana Bat.

Site Selection

Many of the potential flight corridors are illustrated on the map in A and described in previous sections of this document. Major flight corridors that are suitable for the capture of bats include the mainstem of the Blanchard River, Lye Creek, and Eagle Creek. In these areas, there are ample sections of the flight corridor with a nearly enclosed tree canopy. More open areas, especially in the more urban zones, will utilize bridge overpasses and single overarching trees. In addition, there are a number of utility corridors, bike paths, and access roads that can all serve as potential flight corridors. Netting corridors should be selected based on best physical characteristics of the site. Refinements to specific net locations can be made based on the best professional judgment of the field investigator.

Netting Season and Climatalogical Conditions

The Indiana Bat Recovery Team indicates that the appropriate time frame for conducting these studies runs from May 15 through August 15. Studies conducted outside of this time period may still reveal the presence of Indiana bat, but it is difficult to determine if the specimen is a resident of the area or a migratory individual. Furthermore, May 15 is the earliest possible date and is contingent upon appropriate climatalogical conditions. All studies must be conducted during nights with no precipitation and temperatures that do not fall below 10 degrees Celsius. In addition, wind conditions that are strong enough to move mist-nets may make nets more visible to bats and mist-netting studies should not be conducted under these conditions.

Mist-Netting - Materials

Mist-netting procedures employed for all studies and at all sites should follow guidelines developed by the Indiana Bat Recovery Team (USFWS, 1983) and endorsed by the U.S. Fish and Wildlife Service. Sites should be selected as described above. At each site, a tier of nylon, low visibility, mist nets should be erected across likely flyways and other areas where bat activity is noted. These nets will be erected to sufficient height and width to entirely block off the flight corridor. Nets will be secured to a rope-and-pulley system suspended from telescoping poles or trees adjacent to the flyway (Kunz, 1988). Nets should be erected during the twilight hours and monitored every 20 minutes for a minimum of 5 hours.

Data Collection

Basic biological data should be collected from all bats netted including species identification, ear, tragus, hind foot, and forearm length, gender, age (juvenile or adult), weight in grams, wing condition, and reproductive condition (if discernible). All bats should be released at the site of capture. Additional information recorded will include the climatalogical conditions described above, date, time of capture, lunar phase, and percent cloud cover. All data will be recorded on standard data sheets.

If Indiana Bat are encountered during mist-netting surveys the United States Fish and Wildlife Service and Ohio DNR Division of Wildlife must be notified within 24 hours and additional information must be collected. Each individual captured should have voucher photographs taken of the head, body, and species-specific identifiable features, such as the calcar, foot, or mask. All Indiana Bats should be banded according to USFWS protocols using bands issued by the Ohio Department of Natural Resources, Division of Wildlife.

Radio-Telemetry

Should Indiana Bat be encountered, radio telemetry should be conducted on up to 4 specimens (3-4 females, no more than 1 male). A transmitter of 0.35 grams should be applied to the mid-sagittal dorsal surface midway between the scapulae and external origin of the tail using non-toxic skin-bond cement. Animals so tagged should be located and monitored with a tracking receiver to determine roost location and subsequent use.

Roost trees, and maternity colonies should all be identified and mapped. Photos, GPS location, tree species, dbh, site characteristics, and exit counts should be collected at each roost. Roosts should be located and monitored for two weeks or the life of the transmitter.

Recommended Level of Effort

The Indiana Bat recovery plan provides guidance for scoping mist-netting surveys (USFWS, 1983). Projects are scoped based on acreage of forested habitat OR length of stream or linear impact, whichever is greater. Based on the results of this habitat survey the project is best scoped as a linear corridor.

Linear and stream projects require 1 net site/km of corridor. At each site, two net locations are established and run for two consecutive nights for a total of 4 net-nights (1 site x 2 net locations x 2 nights = 4 net-nights). Based on the results summarized in Table 2, the following level of effort is recommended:

Ottawa Area (13.54 km of riparian habitat) – 14 sites (56 net-nights)

Findlay Area (20.49 km of riparian habitat) – 21 sites (84 net-nights)

In addition, it is recommended that at least 4 additional sites (16 net-nights) be allocated for some of the larger woodlots that are removed from the riparian corridor.

Combined, both the Ottawa and Findlay areas will require a minimum of 39 sites (156 net-nights).

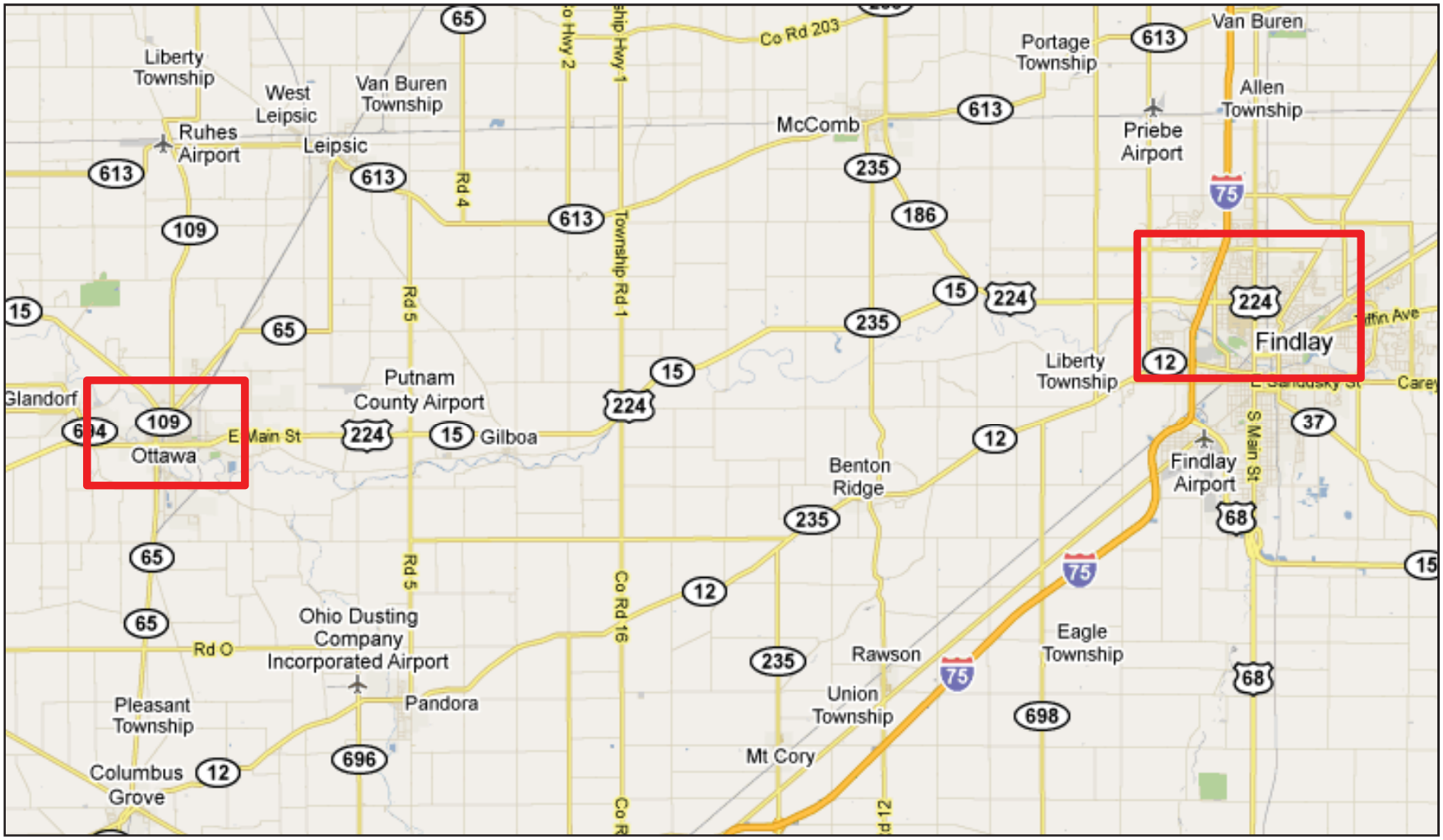
Recommended Deviation from Standard Methods

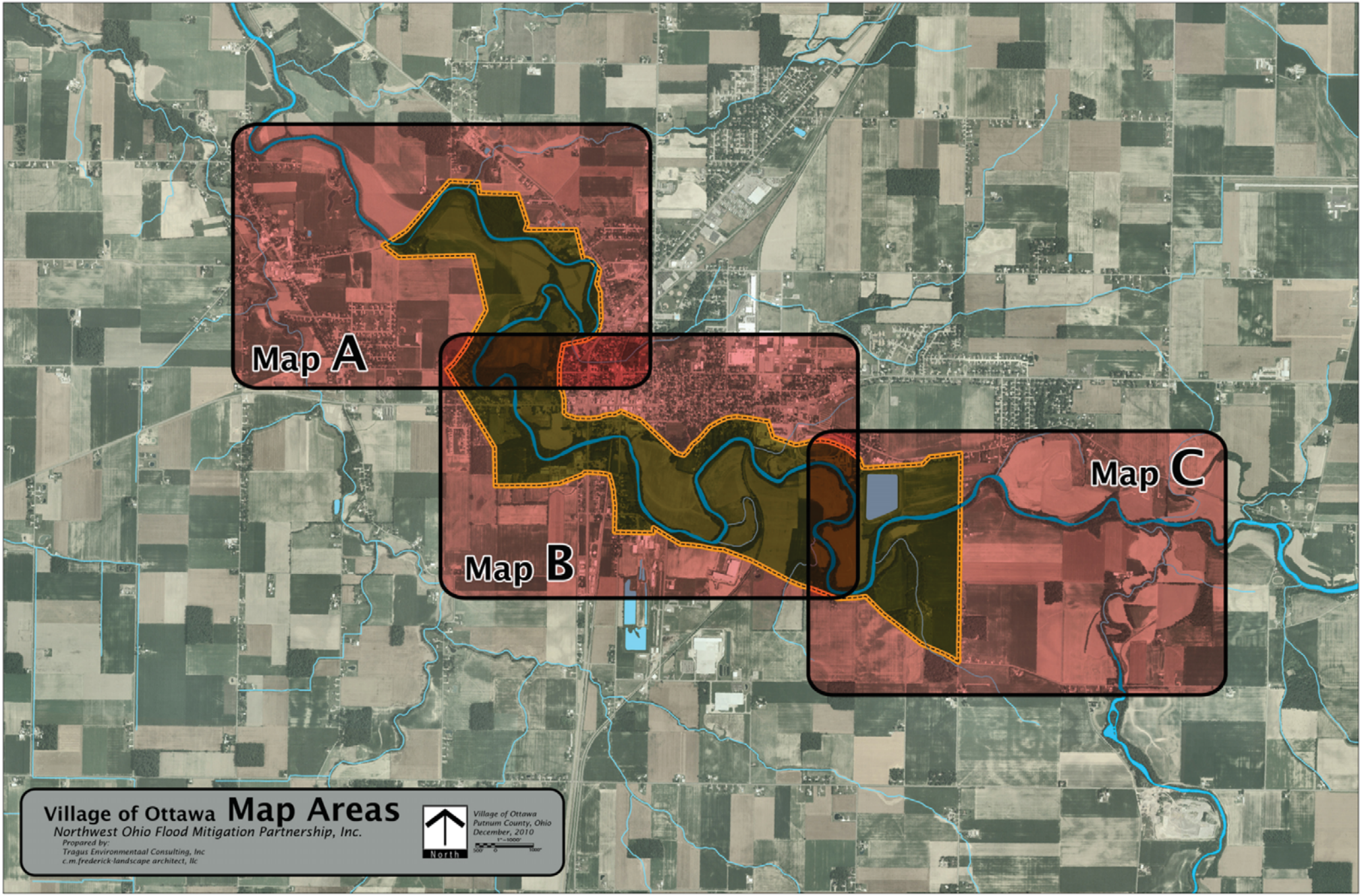
Guidelines issued by the USFWS are recommendations. In many situations, the conditions encountered in the field merit consideration for flexibility based on the professional judgment of the investigator. It is recommended that the field researcher be allowed to move net-locations at their discretion as long as total number of net-nights is 156 or greater. This flexibility allows the field crews to respond to specific environmental conditions experienced during the course of the investigation.

Appendix A
General Location of Study Area and Results of Habitat Survey for Indiana Bat (Myotis sodalist)

Appendix A

Location Map of Study Area – General Road Map





Village of Ottawa Map Areas

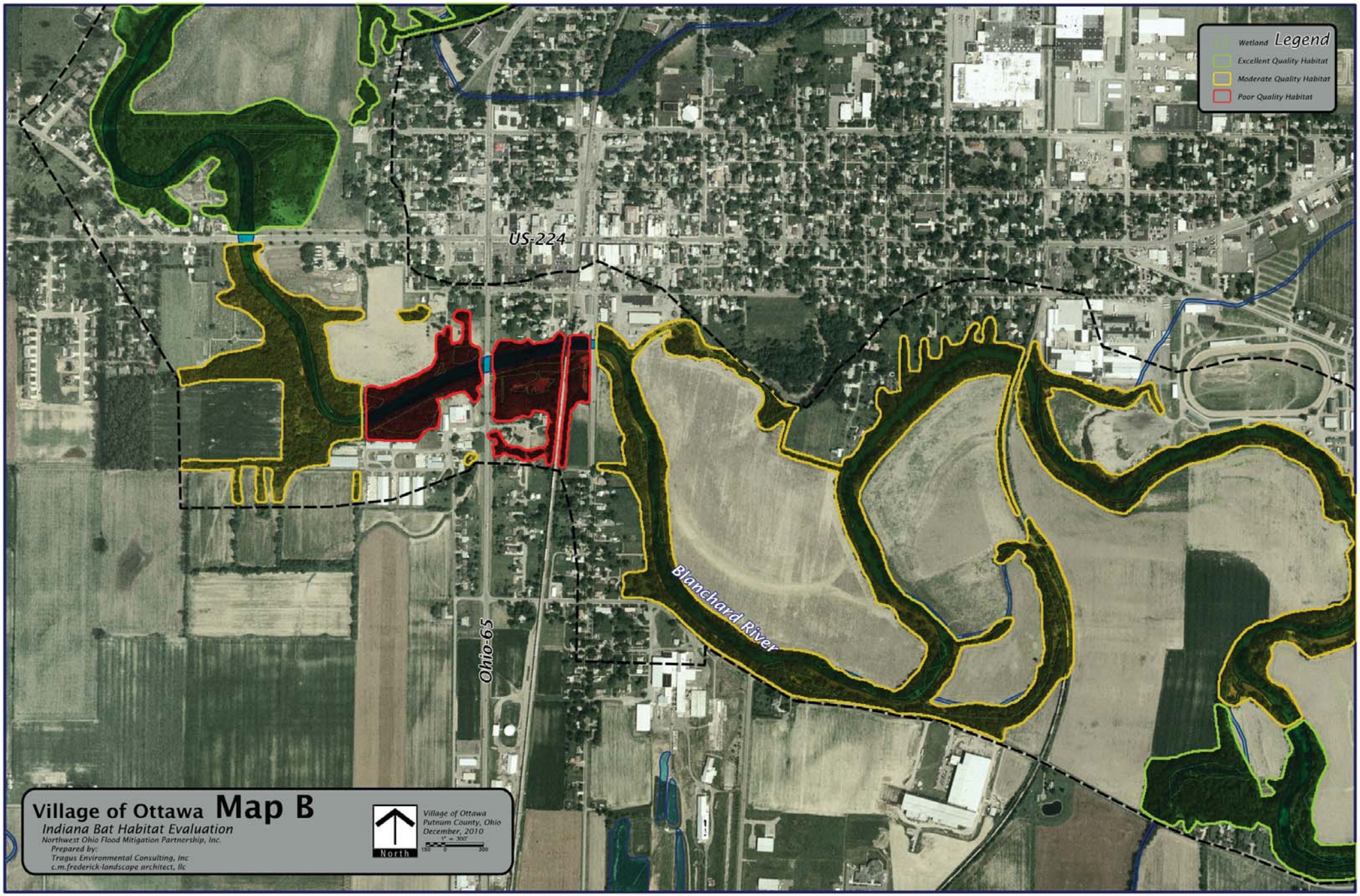
Northwest Ohio Flood Mitigation Partnership, Inc.

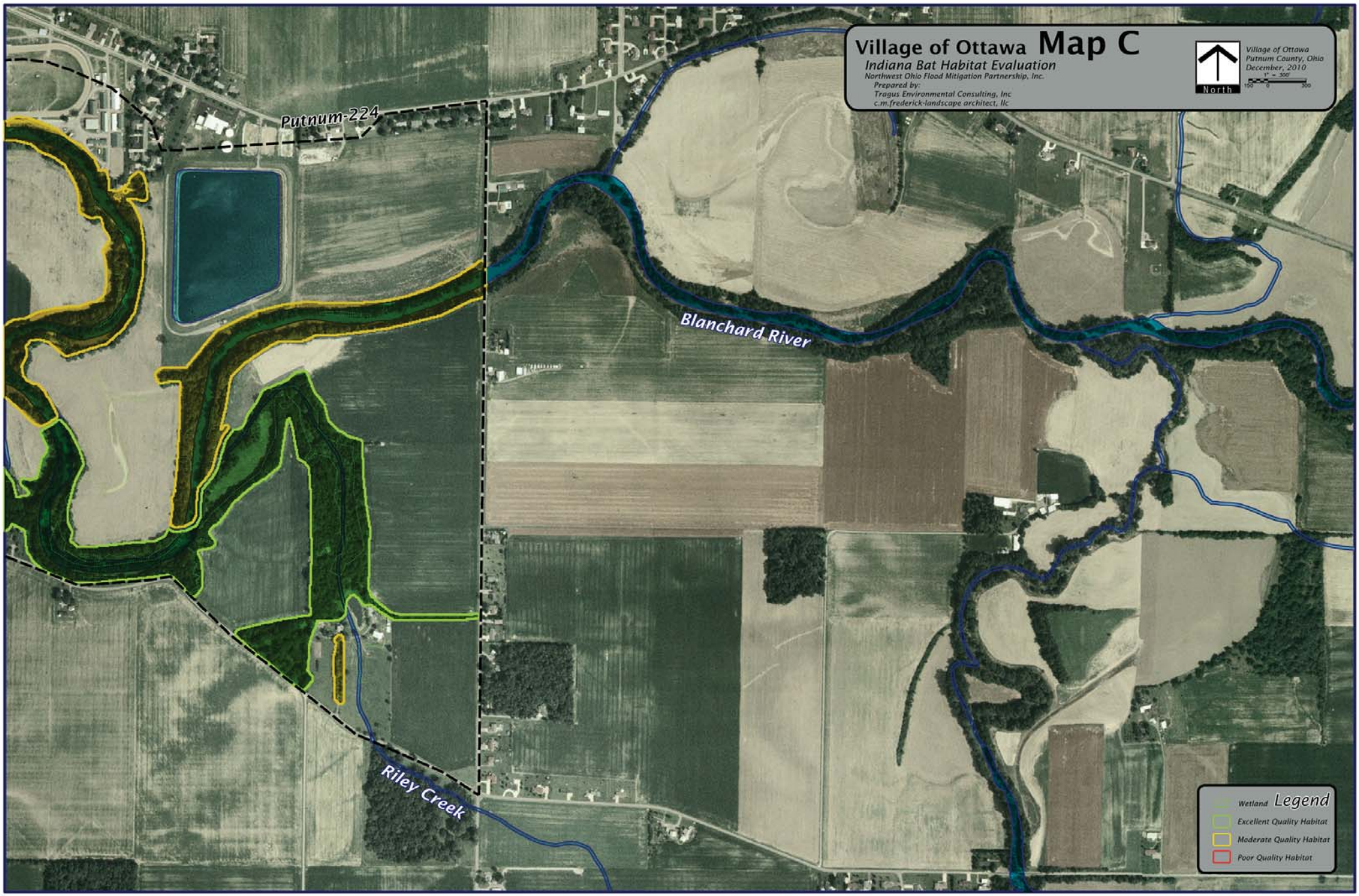
Prepared by:
Tragus Environmentaal Consulting, Inc
c.m.frederick-landscape architect, llc

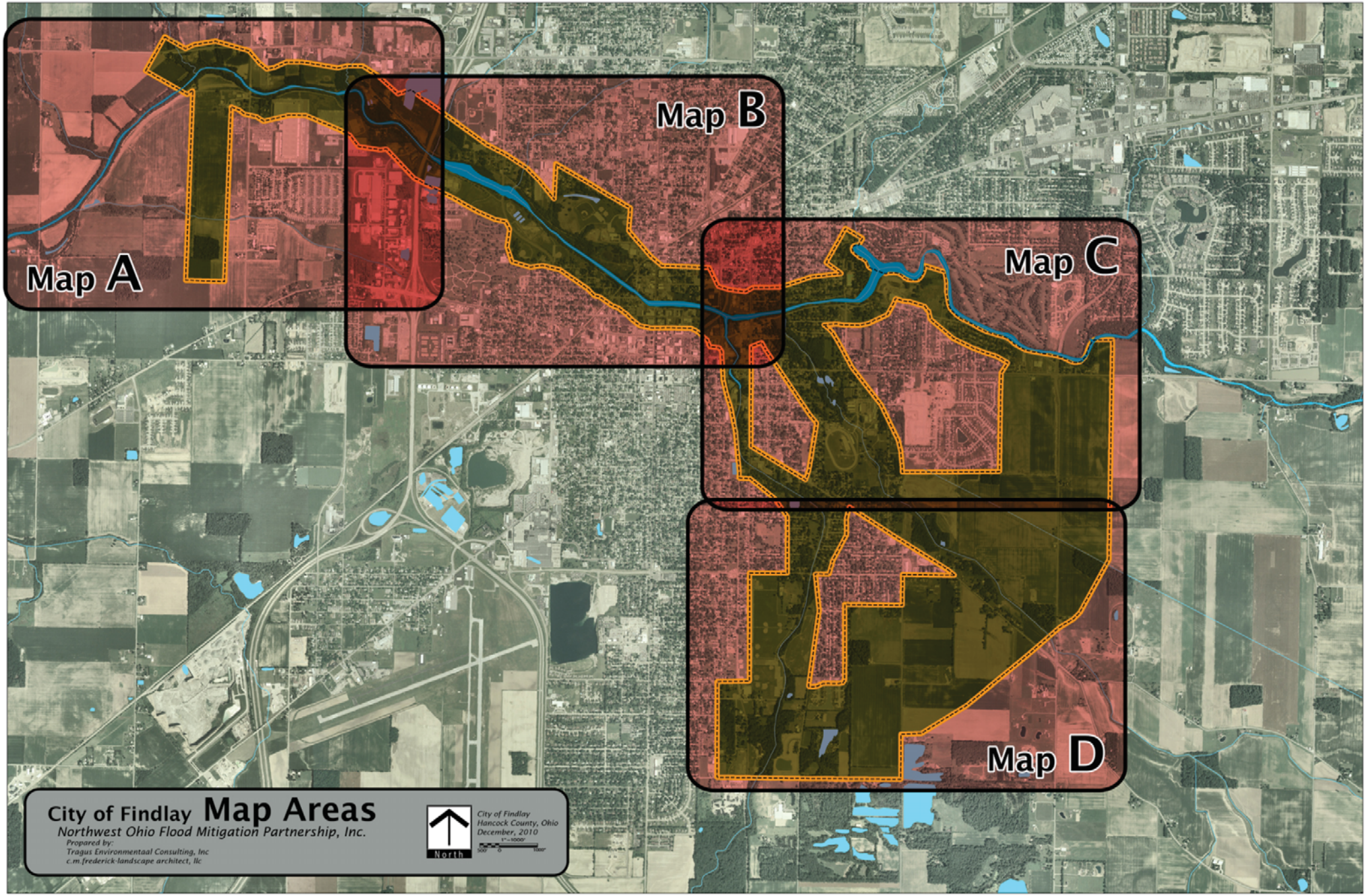
North

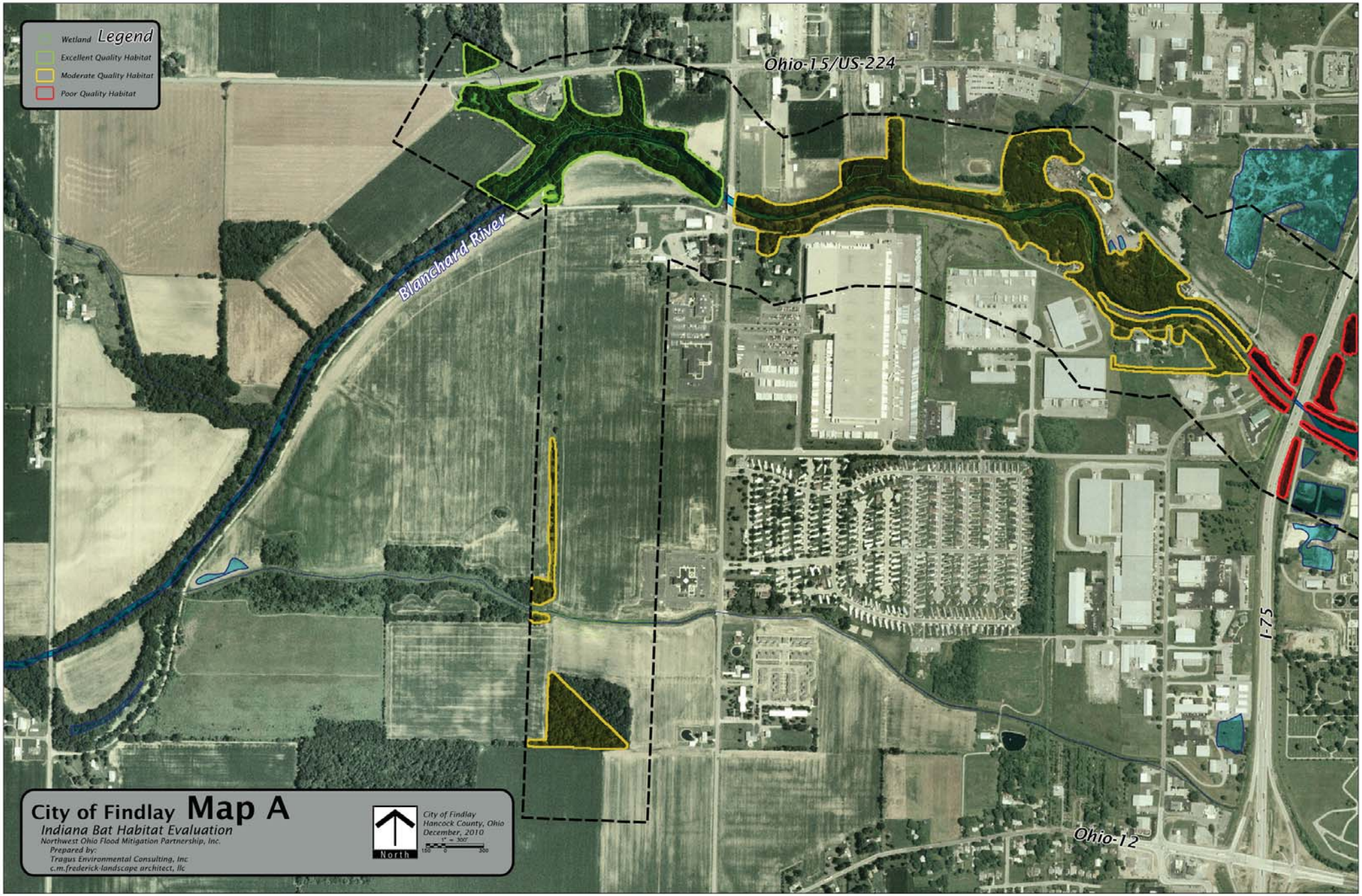
Village of Ottawa
Putnum County, Ohio
December, 2010
1"=1000'


Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat
Ohio-15
Blanchard River
Ohio-694
Cranberry Creek
Ohio-65
Tawa Run
Village of Ottawa Map A
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc
c.m.frederick-landscape architect, llc
North
Village of Ottawa
Putnum County, Ohio
December, 2010
1" = 300'
150 0 300


Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat
US-224
Ohio-65
Blanchard River
Village of Ottawa Map B
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc
c.m.frederick-landscape architect, llc
North
Village of Ottawa
Putnum County, Ohio
December, 2010
1" = 300'
150 0 300


Village of Ottawa Map C
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc
c.m.frederick-landscape architect, llc
Village of Ottawa
Putnum County, Ohio
December, 2010
1" = 500'
North
Putnum-224
Blanchard River
Riley Creek
Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat


Map A
Map B
Map C
Map D
City of Findlay Map Areas
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmentaal Consulting, Inc
c.m.frederick-landscape architect, llc
North
City of Findlay
Hancock County, Ohio
December, 2010


Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat
Ohio-15/US-224
Blanchard River
I-75
Ohio-12
City of Findlay Map A
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
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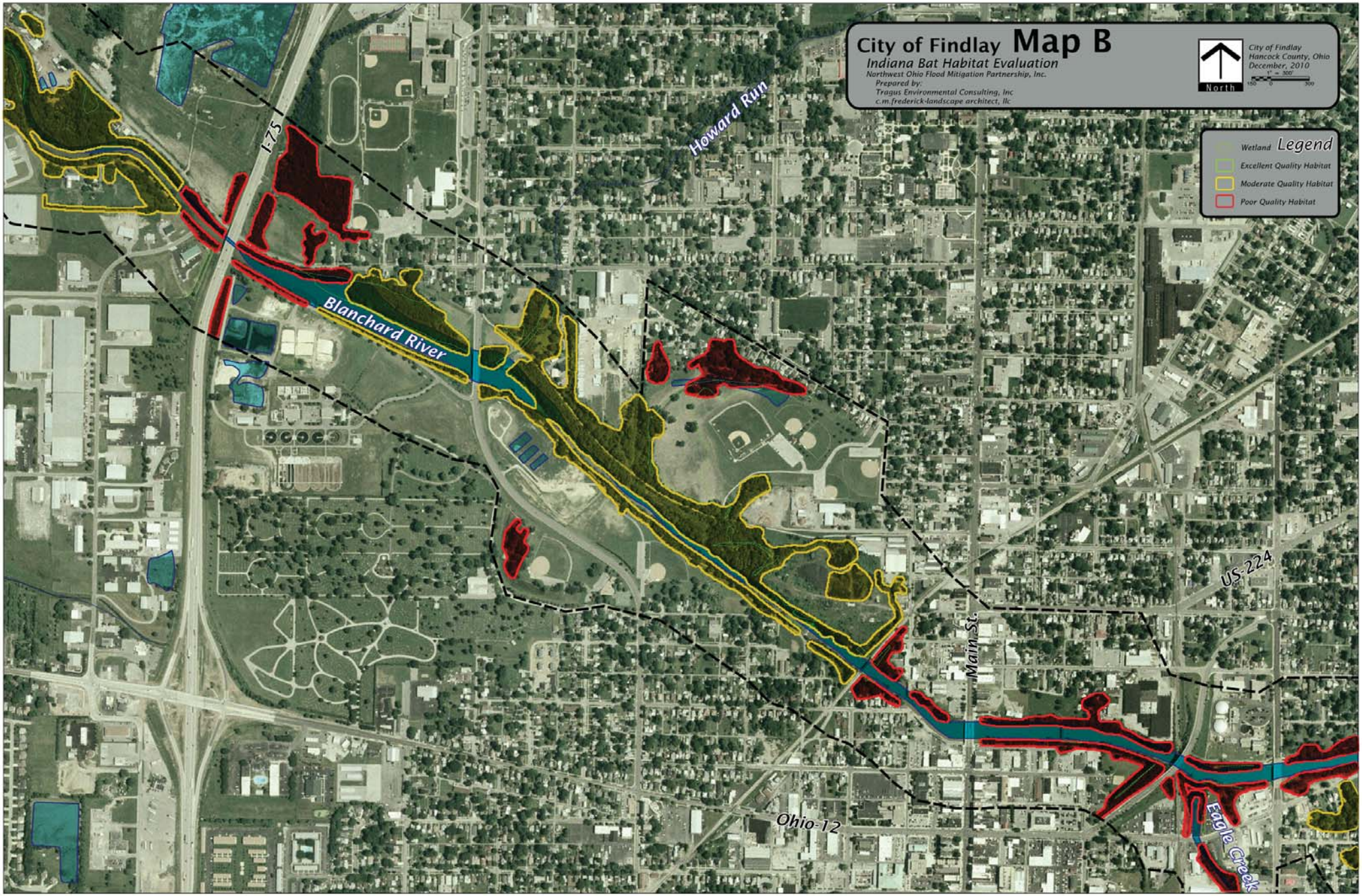
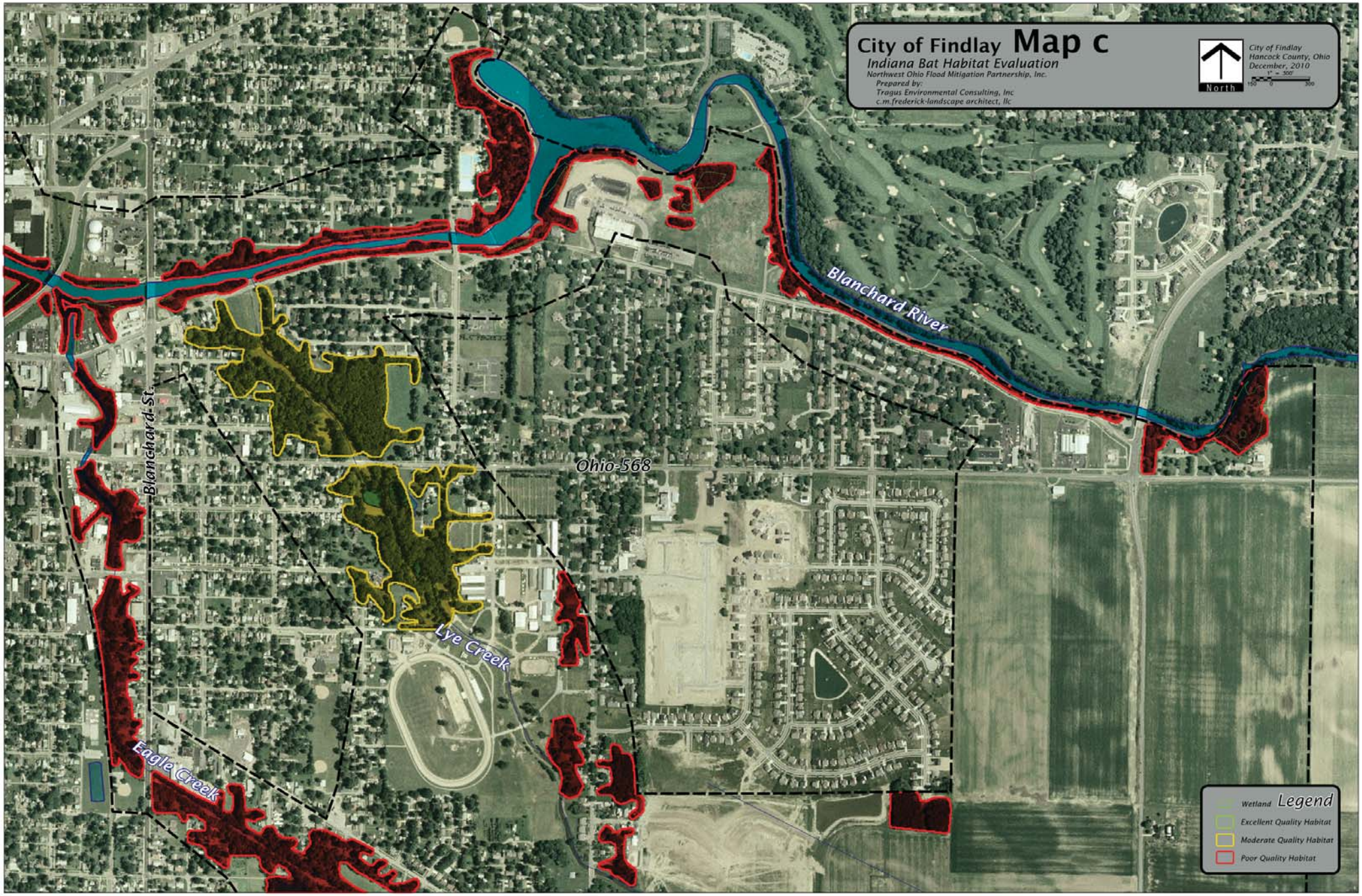
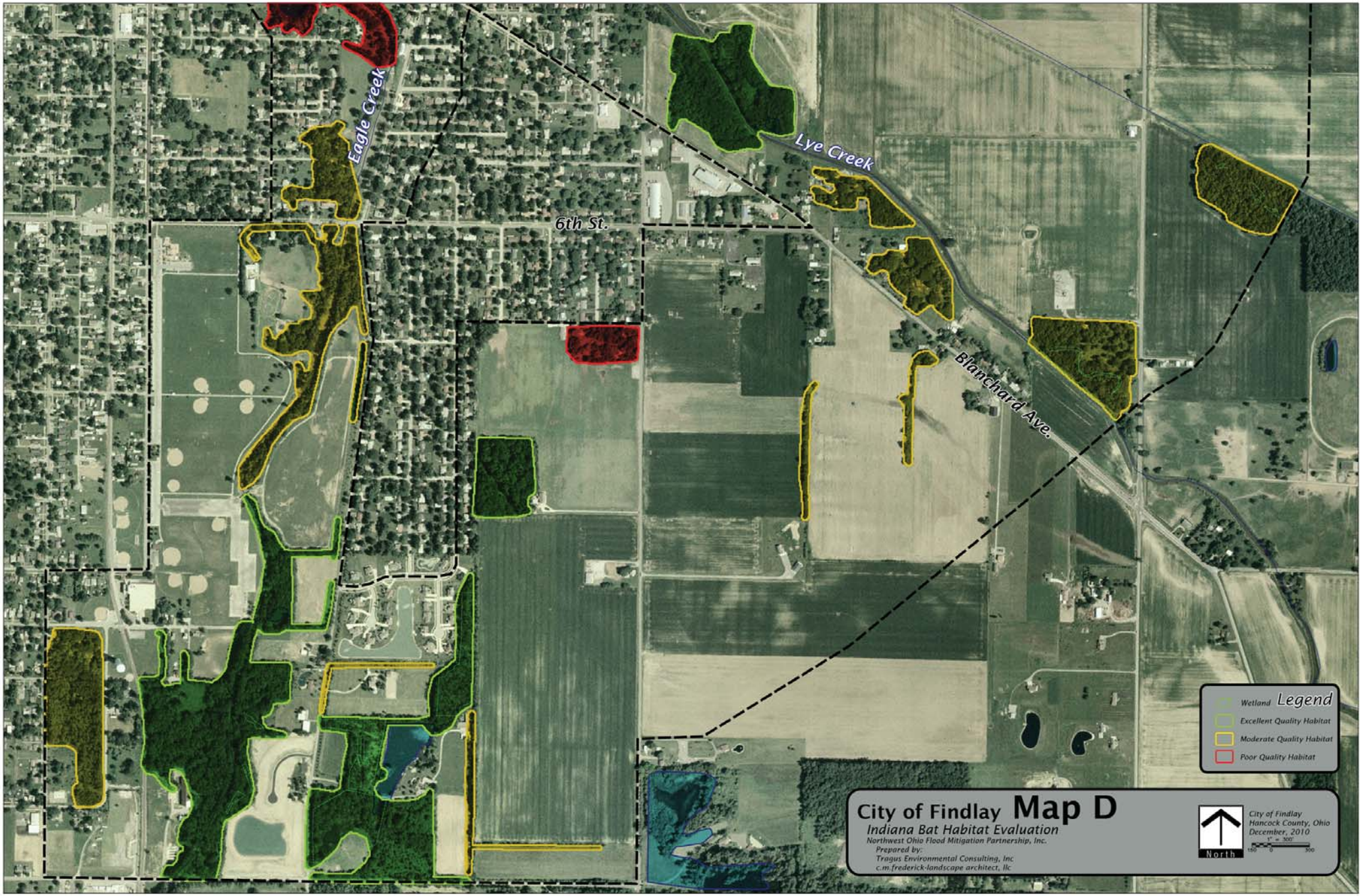
North
City of Findlay
Hancock County, Ohio
December, 2010
1" = 300'
150 0 300


City of Findlay Map B
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc
c.m.frederick-landscape architect, llc
North
City of Findlay
Hancock County, Ohio
December, 2010
1" = 500'
Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat
I-75
Howard Run
Blanchard River
US-224
Main St.
Ohio-12
Eagle Creek

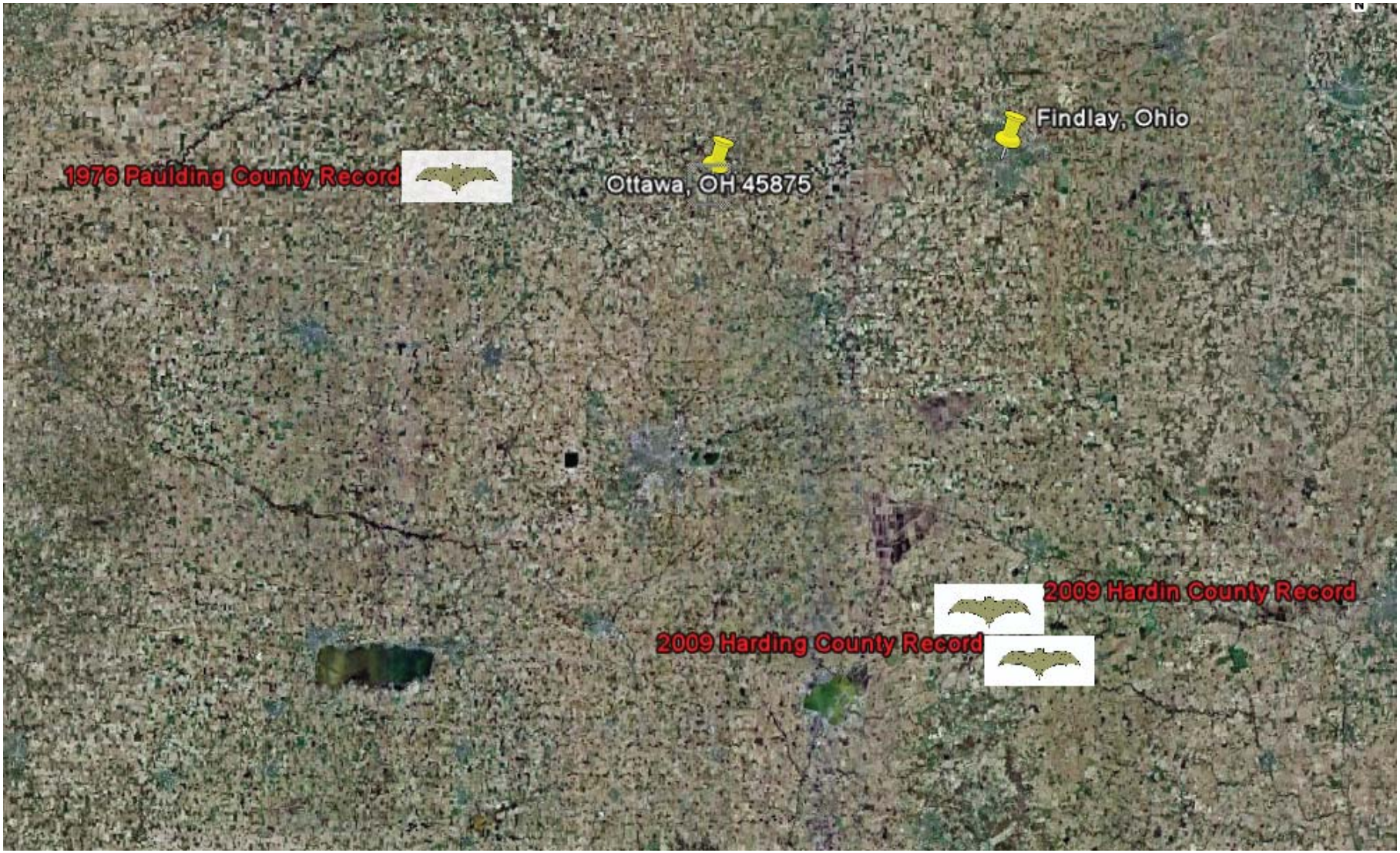

City of Findlay Map c
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc
c.m.frederick-landscape architect, llc
City of Findlay
Hancock County, Ohio
December, 2010
1" = 500'
North
Blanchard River
Blanchard St.
Ohio-568
Lye Creek
Eagle Creek
Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat


Eagle Creek
Lye Creek
6th St.
Blanchard Ave.
Legend
Wetland
Excellent Quality Habitat
Moderate Quality Habitat
Poor Quality Habitat
City of Findlay Map D
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc
c.m.frederick-landscape architect, llc
North
City of Findlay
Hancock County, Ohio
December, 2010
1" = 500'
500 0 500

Appendix B
Ohio Indiana Bat GIS Database

Appendix B-1

Landscape features from nearest historical records for Indiana bat (summer/brooding)



Appendix B-1

Landscape features from nearest historical records for Indiana bat (1976, Paulding County, Ohio)

Appendix B-1

Landscape features from nearest historical records for Indiana bat (2009 Hardin County, Ohio)

Appendix B-1

Landscape features from nearest historical records for Indiana bat (2009 Hardin County, Ohio)

Appendix C
Report from the Ohio Department of Natural Resources, Division of Natural Areas and Preserves – Natural Heritage Database

Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR — SEAN D. LOGAN, DIRECTOR

Division of Wildlife
John M. Daugherty, Acting Chief
2045 Morse Rd., Bldg. G-3
Columbus, OH 43229-6693
Phone: (614) 265-6300

October 29, 2010

Mike Johnson
Tragus, Inc.
37 N. Highland Ave.
Akron, OH 44313

Dear Mike:

After reviewing our Biodiversity Database, I find the Division of Wildlife has no records for Caves, Bat Colonies or the Indiana Bat (*Myotis sodalis*, state endangered, federal endangered) in the Blanchard River Flood Protection project area, including a one mile radius, in the village of Ottawa, Putnam County, Ottawa Quad, or the city of Findlay, Hancock County, Findlay and Arcadia Quads.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

Debbie Woischke, Ecological Analyst
Ohio Biodiversity Database Program

Appendix D
Representative Photographs – Ottawa Area

Appendix D

Representative Photographs Ottawa Area

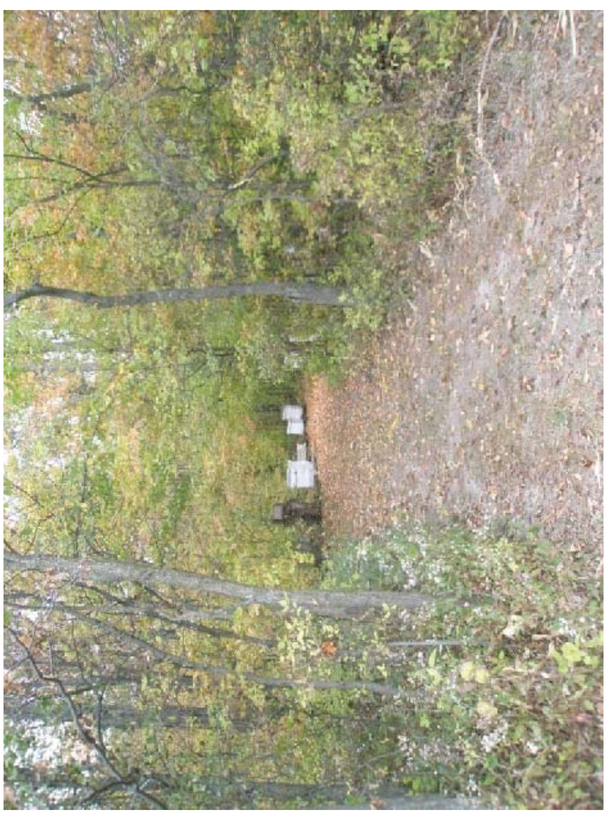
Blanchard River

Map A

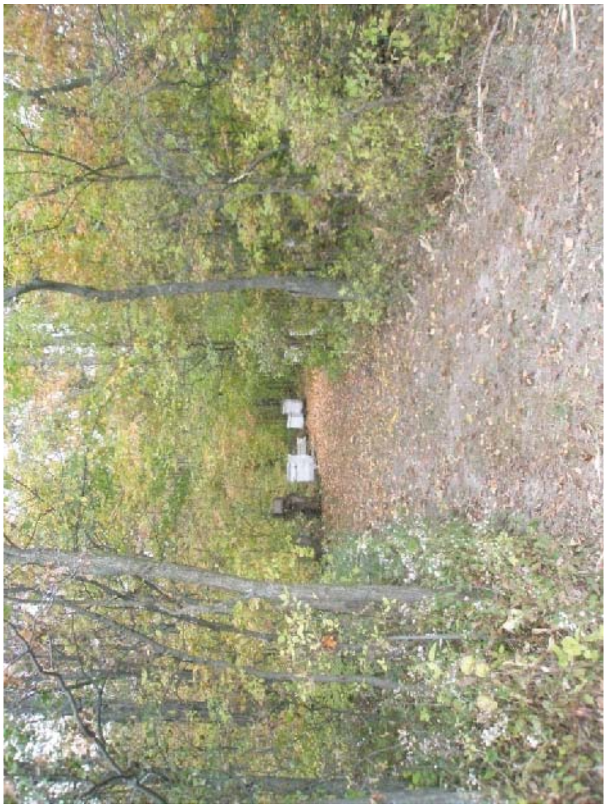



Appendix D
Representative Photographs Ottawa Area
Blanchard River
Map B



Appendix D
Representative Photographs Ottawa Area
Blanchard River
Map C




Appendix E
Representative Photographs – Findlay Area

Appendix E

Representative Photographs Findlay Area

Blanchard River

Map A

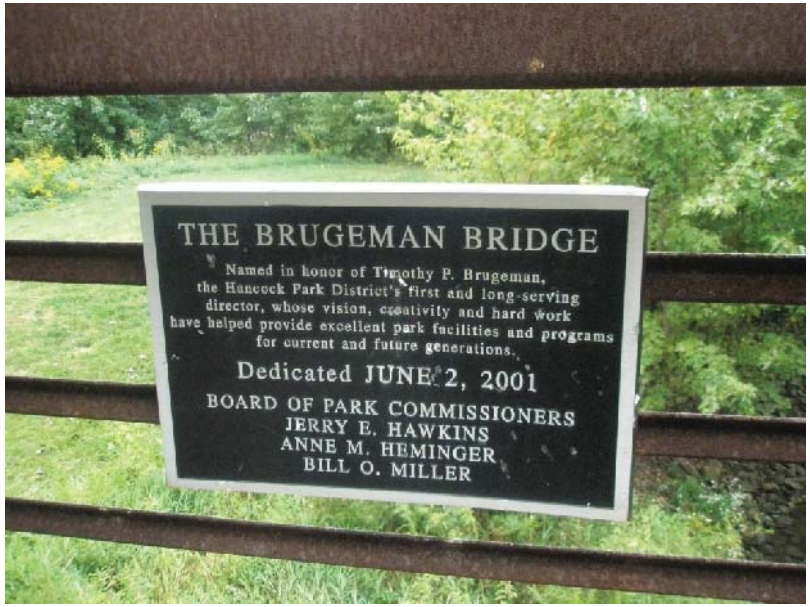

LIBERTY LANDING
SPORTSMEN RIVER ACCESS
HANCOCK PARK DISTRICT

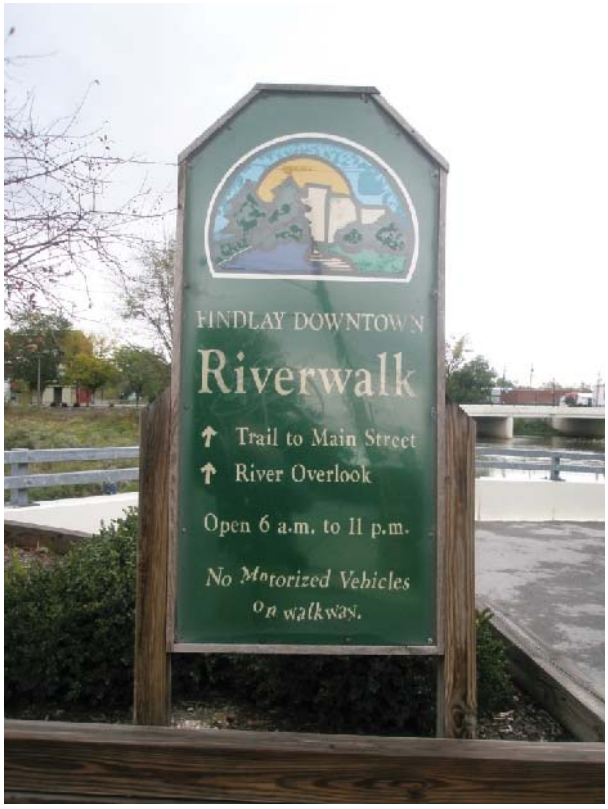
Appendix E

Representative Photographs Findlay Area

Blanchard River

Map B


THE BRUGEMAN BRIDGE
Named in honor of Timothy P. Brugeman,
the Hancock Park District's first and long-serving
director, whose vision, creativity and hard work
have helped provide excellent park facilities and programs
for current and future generations.
Dedicated JUNE 2, 2001
BOARD OF PARK COMMISSIONERS
JERRY E. HAWKINS
ANNE M. HEMINGER
BILL O. MILLER

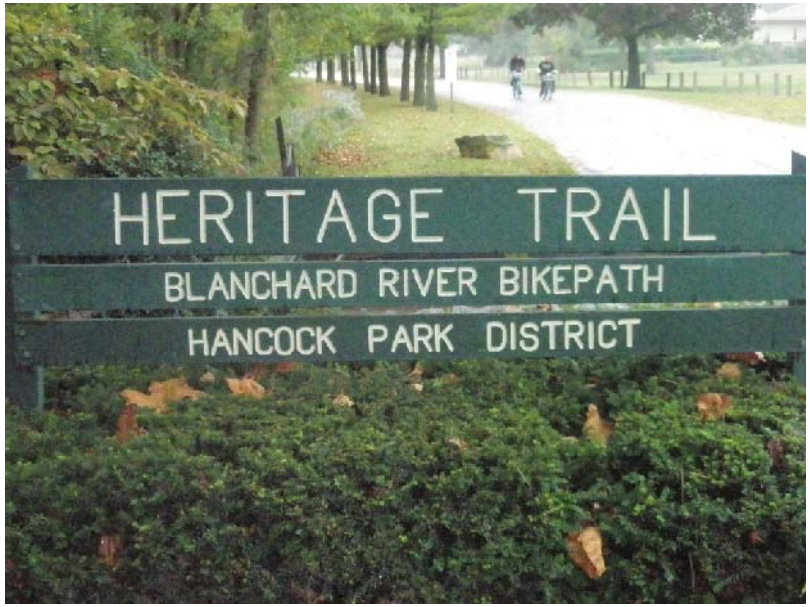

FINDLAY DOWNTOWN
Riverwalk
Trail to Main Street
River Overlook
Open 6 a.m. to 11 p.m.
No Motorized Vehicles
on walkways.


OHIO
HISTORICAL
MARKER

Appendix E
Representative Photographs Findlay Area
Blanchard River
Map C


WELCOME
OLD MILL STREAM
PARKWAY
Sportsmens River Access
Hancock Park District


RIVERSIDE LANDINGS
BOAT RENTAL CLOSED
HANCOCK PARK DISTRICT


HERITAGE TRAIL
BLANCHARD RIVER BIKEPATH
HANCOCK PARK DISTRICT

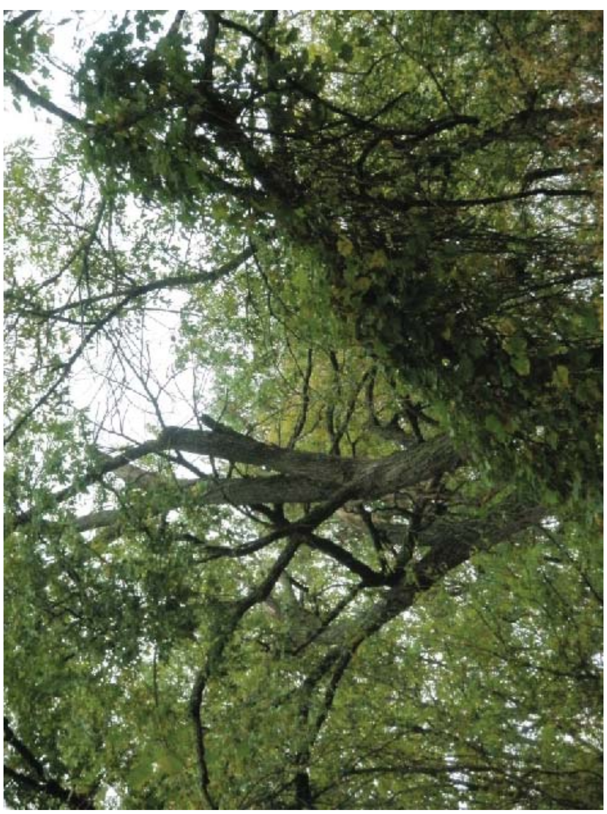
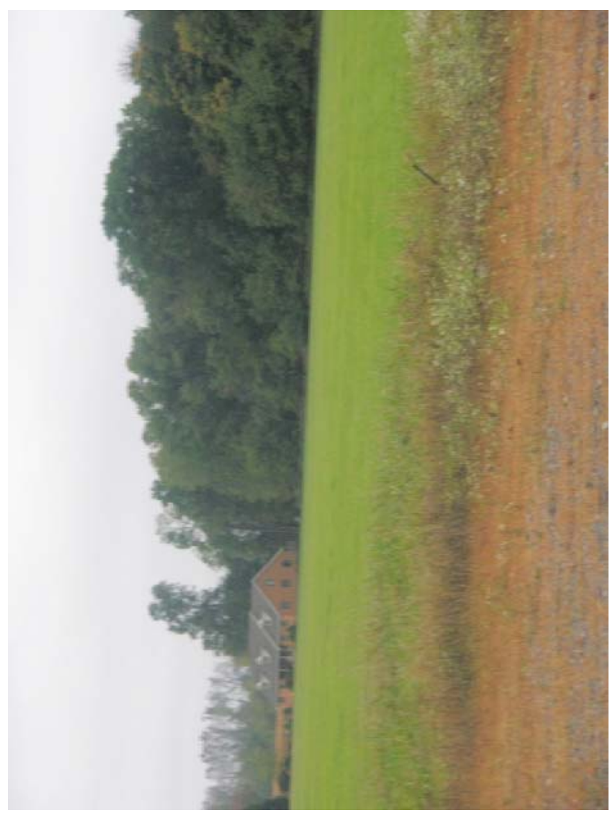
Appendix E

Representative Photographs Findlay Area

Eagle Creek

Maps C-D






Welcome
BLUE ROCK
Nature Preserve
This 11 acre natural area has been reclaimed from a strip
mine, donated and restored to temperation
with the DuPont Corporation. Heavy
blue clay was excavated from
this site and was used in the
production of the world
famous Blue Rock brand
clay targets at the nearby
Remington Arms Company
during the 20th century.
The wetland and woods are naturally succeeding.
Lady Bug Trail
Follow the loop trail,
returning to this parking lot.
Park Hours
Open dawn to dark, daily.
This area regularly patrolled. See Park Rules & Regulations on bulletin.
HANCOCK TRAILS
CONSERVATION

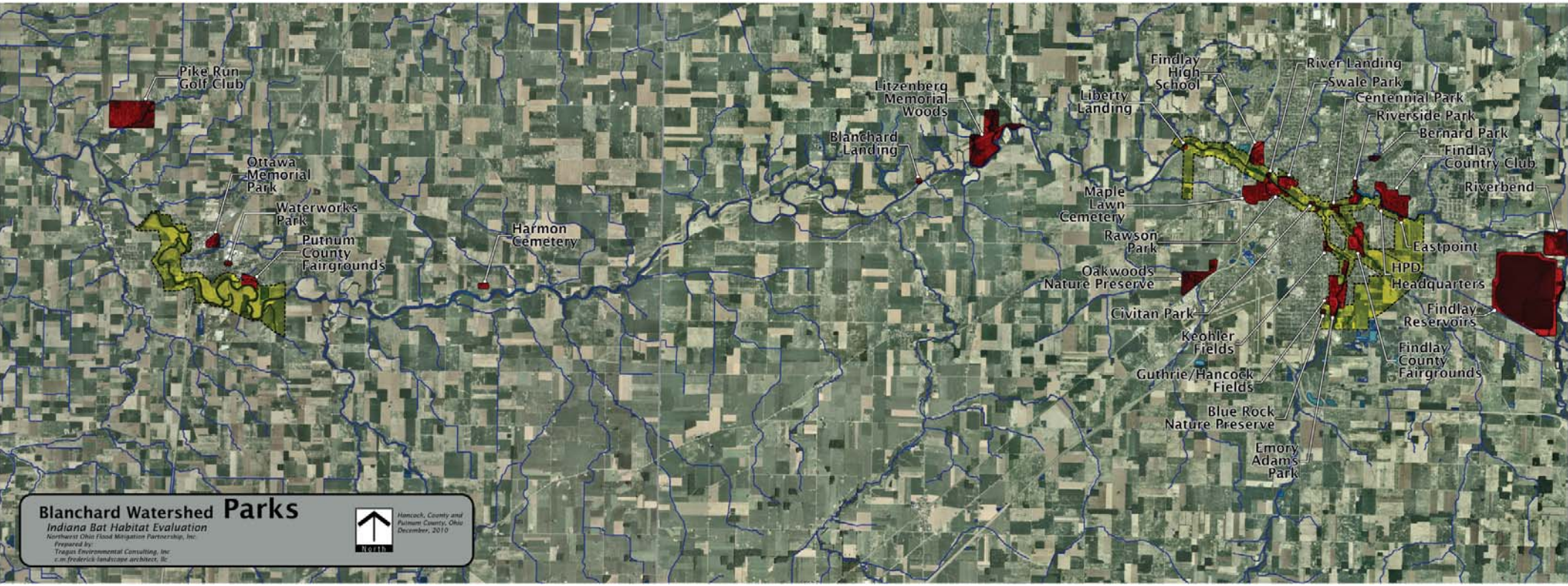
Appendix E

Representative Photographs Findlay Area

Lye Creek

Maps C-D

Appendix F
Overview Map Showing Regional Protection Areas


Pike Run Golf Club
Ottawa Memorial Park
Waterworks Park
Putnum County Fairgrounds
Harmon Cemetery
Litzenberg Memorial Woods
Blanchard Landing
Findlay High School
Liberty Landing
River Landing
Swale Park
Centennial Park
Riverside Park
Bernard Park
Findlay Country Club
Riverbend
Maple Lawn Cemetery
Rawson Park
Eastpoint
HPD Headquarters
Oakwoods Nature Preserve
Civitan Park
Findlay Reservoirs
Keohler Fields
Findlay County Fairgrounds
Guthrie/Hancock Fields
Blue Rock Nature Preserve
Emory Adams Park
Blanchard Watershed Parks
Indiana Bat Habitat Evaluation
Northwest Ohio Flood Mitigation Partnership, Inc.
Prepared by:
Tragus Environmental Consulting, Inc.
c.m. frederick landscape architect, llc
NORTH
Hancock, County and Putnum County, Ohio
December, 2010

Appendix G
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